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JULY • 1933

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N. V. De Bataafsche Petroleum Maatschappij Meets at The Hague

Meeting of the board of directors of the principal operating subsidiary of the Royal Dutch-Shell Combine, presided over by Sir Henri Deterding, in the main administration building, at The Hague, Holland. From left to right around the table: Andrew Agnew, Jonkheer Louden, Sir Robert Waley Cohen, G. C. D. Dunlop, August Philips, J. E. F. de Kok, Sir Henri Deterding, J. B. Aug. Kessler, J. Th. Erb, C. J. K. van Aalst, J. Luden, and N. van Wijk. Photograph published by courtesy of Dr. Erich Salomon.

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PETROLEUM

Hope for International Agreement

PROSPECTS for international stabilization which have seemed to be at low ebb recently are actually more favorable now than at any previous time as a result of the legislation recently enacted by the Congress of the United States. Heretofore the anti-trust laws of the country have made it impossible for American oil companies to enter into agreements among themselves or with other interests in matters affecting production or prices. Now that this obstacle is removed the first task at hand is to put the domestic industry in order. A strong and sincere effort to accomplish this has been put forth by the committee of which Mr. Charles E. Arnott, President of Socony-Vacuum Corporation, is chairman. Once a workable scheme of regulation has been put into effect in the home industry it will be possible for American representatives to enter an international conference with authority to deal on equal terms with the spokesmen for other branches of the industry.

When that time comes a new international conference undoubtedly will be called. In the meantime it is worth while for other international interests to hold the position they have maintained during the past year so that when the opportunity for effective action is presented they may be in a position to take advantage of it.

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Oil's Relation to New U. S. Laws

ALTHOUGH a half dozen bills providing for the application of federal control to the petroleum industry of the United States were introduced at the recent session of Congress, adjournment was finally taken without the enactment of mandatory legislation on this subject. Secretary of the Interior Ickes gave his active support to the proposal to extend national regulation to cover the production, transportation and marketing of oil and personally appeared before Congressional committees in advocacy of such a course. The President himself, while not making the enactment of oil control legislation a part of the program which he asked Congress to adopt, went to the length of writing to the titular leaders of both the Senate and the House of Representatives, calling attention to the serious situation confronting the oil industry and suggesting legislation that would enable the federal government to deal with the matter. Opposition to the invasion of the sphere of state sovereignty involved in dictating the volume of production within state lines was strong enough, however, to prevent the adoption of special legislation applying to oil.

As the matter stands at present, therefore, any action taken for the stabilization of the oil industry will have to be through utilization of the authority conferred by the national industrial recovery act. This law authorizes the adoption by trade groups or associations within an industry of codes of business procedure. Upon approval by the proper federal officials such codes or regulations become binding upon all members of the industry. The purpose is to prevent the nullification of constructive business efforts through the refusal of a small minority to conform to regulations that are beneficial both to the industry itself and to the general public. An effective weapon for the enforcement of this feature of the law is contained in the section of the act which provides for the requirement of a federal license in order to carry on business.

Compulsory regulation is still possible under this act, however, for it is specifically stated that in the event of failure of the members of an industry to agree upon a satisfactory code the President, of his own initiative or upon receipt of complaints that conditions in a particular industry are inimical to the public welfare, may establish a code of competition which will have the same force as one set up by the industry itself.

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Situation Calls for Constructive Action

IN CERTAIN quarters there appeared to be a disposition to defer or avoid action under the law recently adopted. Some improvement in the prices of crude and products already was in evidence, why not wait and see whether it continues? Such seemed to be the attitude of this element before the recent meetings in Chicago. This certainly was a short-sighted view. Fortunately it did not prevail among the great majority of the members of the industry as is indicated by the fact that numerous meetings and discussions have taken place among representatives of the leading trade organizations since the bill became law in an effort to work out the main features of a code of practice fair to all elements in the business and to consumers of petroleum products as well, which resulted in the formation of a producers' and a marketers' code.

The sound and sensible way to look at the existing situation is that the federal government has issued an invitation to the

industries of the country to set up a fair and reasonable form of self-government. It has removed obstacles that long have prevented the efficient functioning of business. It has taken this action in the hope that it may contribute to the general return of national prosperity by enabling great industries to end or at least to minimize wasteful competition and to operate profitably. If this can be done we shall have no more interference by government with business than we have had in the past. The difference will be that official activities will be exercised constructively instead of repressively. If it is not done we may expect to see a great deal more of government in business for behind the invitation to inaugurate a system of self-government is the clear implication that if a majority of the units in an industry fail to agree on a code of procedure, or make no effort to do so, the government will step in and do the job for them. Obviously each industry should form a code acceptable to the government and abide by the regulations embodied in the instrument adopted. The terms of the code, however, are of the utmost importance to the industry and should be carefully weighed and considered before being adopted.

▼

Anglo-Persian's New Agreement

RATIFICATION by the Persian Parliament and approval by the Shah has given effect to the new agreement between the Persian Government and the Anglo-Persian Oil Company defining the terms on which the company is to continue working the rich oil deposits of Persia. This brings to a satisfactory conclusion a disagreement that has existed for several years and that was brought to a sharp issue by the announcement of the Persian Government in November last that it had cancelled the company's concession.

Essential features of the new agreement are as follows:

The territory of the concession is to be reduced to 100,000 square miles and the company is allowed until the end of 1938 to designate the particular areas that it will retain.

The concession is extended to cover a period of 60 years, approximately doubling the period remaining under the old agreement.

The company is to pay a royalty of 4s per ton with a minimum annual payment of £750,000.

In exchange for complete exemption from taxation by state or local authorities the company is to pay 9d per ton of oil up to 6,000,000 tons and 6d beyond that figure with a minimum of £225,000 annually for the first 15 years and £300,000 for the next 15-year period. At the end of 30 years a new agreement is to be made for succeeding payments.

The company is to pay forthwith to the Persian Government £1,000,000 in settlement of all governmental claims and is to pay 20 percent of any distribution through dividends or to reserve above five percent on the present ordinary capital.

Differences that may arise between the parties to the agreement are to be referred to two arbitrators and in case of their failure to agree an umpire may be appointed by the President of the Hague tribunal.

While the sums to be paid to the Persian Government by the company will be substantially larger under the new agreement than heretofore the company itself receives an important advantage from the extension of its concession for another 30 years. In view of the dissatisfaction with the previous agreement which the Persian authorities have expressed for the past several years it was inevitable that provision for increased revenue to the government would have to be provided in any revision that might be undertaken.

The most important benefit from the new agreement, however, is one that has been scarcely mentioned in the discussion of the subject and in the newspaper comment on it. It arises from the fact that the relations between the Persian Government and the Anglo-Persian Company are now on a basis acceptable to both parties. The government may be expected, and in fact specifically undertakes, to facilitate the operations of the company in every reasonable way. The company will be relieved of the constant claims and annoyances that result from attempting to do business with a dissatisfied partner. This is the real triumph of the negotiations which Sir John Cadman has been carrying on in behalf of the company over the past several months, that they have resulted in an agreement that may be expected to operate smoothly and with mutual satisfaction to both the contracting parties. Shareholders of the company will be relieved to learn from the statement issued recently that in spite of the large immediate payment to be made under the new agreement a dividend on the ordinary shares has recently been declared.

▼

Heavy Taxation of Indian Oil

EXCESSIVE taxation is by no means a local problem for the oil industry. Its burden hampers operations and menaces the welfare of petroleum companies in practically all parts of the world. Addressing the annual meeting of stockholders of the Assam Oil Company Limited, in London last month, Sir John Cargill, chairman, directed attention to the heavy imposts levied upon petroleum products in India and the particular charges borne by the company.

"During 1932," he said, "we contributed directly to provincial revenues over Rs 50,000 (one rupee equals 36.5 cents or 1s 6d at normal exchange) in royalties, licenses and rents. Over Rs300,000 were paid out in wages alone and the large sums paid annually to the rail and river companies assist materially, particularly under today's conditions, to maintain the main transport system of the province. For these and other reasons I need not specify the prosperity of the province is very closely connected with that of its petroleum industry.

"In addition to the heavy contributions to provincial revenues we paid to the central government during 1932 no less than Rs13,300,000 for excise, income tax and customs duties. These heavy burdens of taxation are seriously affecting consumption of petroleum products, and this is particularly noticeable in the case of petrol, sales of which declined last year and continue to decline throughout India as, for the same or similar reasons, they are doing elsewhere. Added to the 10 annas which has to be contributed to government on every gallon of petrol sold the private and commercial users of motor vehicles carry heavy burdens in other forms, with the result that increasing numbers of petrol consumers find that they cannot continue to employ this means of transport. The law of diminishing returns seems clearly in operation and alleviation of these burdens will have to be granted if a further decline is to be prevented."

▼

U. S. Oil Industry Adopts Control Through Codes

Formation of Producers' and Marketers' Codes Definitely Cedes Partial Control of Industry to Government. Licensing and Price Fixing Features Bitterly Contested at Chicago Meeting.

JUST PREVIOUS to adjournment the United States Congress, early in June passed the National Industrial Recovery Act, which became law on June 17 a day after the President's signature and is designed to assist economic recovery of the country by increasing commodity prices through reconstructing consuming ability by reemployment and increased wages. The act creates a new relationship between government and industry and provides a radical departure from the former policy of strict individualism and unrestricted competition. Operation of the Act will directly affect the petroleum industry, which under the provisions of Section 3 has already formed a code of fair competition designed to determine the immediate future practices of petroleum companies.

The National Industrial Recovery Act sets aside temporarily the Sherman anti-trust law and substitutes controlled cooperation between the various units of each industry through existing trade associations. Representative associations in each industry are to devise codes of fair competition under which the industry will operate and which will make adequate provision for the relations of labor and capital and the stipulation of minimum wages and maximum hours in such a way as to assure labor sufficient remuneration to support an acceptable standard of living. Reemployment is to be effected at first through the division of existing employment among the greatest possible number of workers.

In short the codes are to define the relations of company to company in each industry and of employer to labor.

Individual sections of the codes are to be decided by a majority of a group that is judged to be representative of at least 60 percent of the industry. The rights of the minority will be protected by the Administration which must approve of the code to make it effective.

With the President's approval, the code becomes the standard of fair competition for the industry and violation of it will be considered a misdemeanor.

Industries that do not voluntarily form acceptable codes may be forced to adopt those drawn up by representatives of the President.

Under this Act the petroleum industry was called to a meeting in Chicago by Axtell J. Byles, president, American Petroleum Institute, for the purpose of drawing up a code, and proceeded to form a producers' code applying to the producing branch of the industry. At a second meeting, also in Chicago, a code of fair competition for refiners and marketers was drawn up. When the groups whose representatives drew up the codes have signified their final approval of its provisions, both the producers' and marketers' codes will be joined and presented at Washington for approval of the President, after which they will become effective for the entire petroleum industry in the United States, subject to whatever changes or additions the President makes when the codes are submitted for approval.

The producer's code was completed on June 17 after a difficult session in which disagreement on important sections of the code was expressed from several sources. The code as finally completed provides for labor in a manner that is understood to coincide with the President's purpose in this aim of the National Industrial Recovery Act. It provides for the regulation of supply in such a way as to equal as nearly as possible demand for crude oil, supply to be equitably allocated between current production, imports and withdrawals from storage, and current production further allocated between states. While wild-catting is not prohibited, no drilling in a newly discovered field is permitted until approved by the President and a license granted for drilling. The President is requested to establish minimum prices for crude oil that will avoid the sale of petroleum below cost of production and retain the benefits of production from stripper wells, which can only be accomplished by maintaining a reasonable return for their operation. In order to protect the consumer the President is also requested to establish maximum prices. Each purchaser must post crude prices and report to the President monthly on the quantity purchased, by whom transported, from whom purchased, and the price paid. Withdrawals from storage will be regulated by the President. Among other minor provisions it is expressly stated that nothing in the code shall be taken to authorize the enforcement of unit operation on producers who are not willing to accept it.

Following the meeting of members of the industry to draw up a producers' code, the representatives of some 57 associations of marketers and refiners met in Chicago to draw up a code for the marketing branch of the industry.

This code does away with the practice of furnishing equipment to service stations and of giving premiums, prizes and quantity discounts. It provides for the fixing of selling prices and differentials and stipulates that refined products shall not be sold for less than the cost of manufacture plus a reasonable profit for wages and management. It also provides for control of refinery output. After some disagreement as to whether the lease and agency practice was to be abolished or retained it was decided to permit its continuance. Labor is provided for in a manner similar to that set forth in the producing code which gives labor the right to organize for collective bargaining and frees it from control by employers in the organization and regulation of such bodies. Membership in a company union shall not be made a condition of employment nor shall labor be refused employment because of membership in any labor organization.

Internal control of the petroleum industry by a majority of its representatives is, therefore, being boldly undertaken in spite of warnings from several quarters that the results are likely to be unpleasantly restrictive in the long run. Led by the present Administration the petroleum industry, like a number of others, is enthusiastically welcoming planned economy and in so doing is delivering itself to a measure of govern-

ment control that may eventually prove irksome. Price fixing by the President, as stipulated in both codes came in for special opposition, both at the meeting and since by those who maintain that the industry is sacrificing its future freedom for an immediate advance in prices, which was by way of being realized through natural economic forces prior to the passage of the National Industrial Recovery Act. Grave apprehension is felt by many members of the petroleum industry at the licensing provision of the code.

While the code provides for a price above the cost of production, the mechanism for determining cost of production has not yet been established and in view of the difficulty of reducing present cost accounting to anything like a comparable basis, inequitable treatment of companies with different cost of production is almost bound to result. So important is this feature that it is entirely pertinent to ask here—what is cost? Aside from the different accounting practices in use among the various companies there is actually a considerable difference in efficiency among different plants. In so far as the fixing of product costs and raw material costs results in profits being based on sheer efficiency, leading to the renovation and modernization of various plants, this section of the code will be beneficial to the industry and to the consumer. But the obvious question of what system of accounting shall be used and what degree of efficiency will be taken to represent fair cost of production, below which prices must not fall, threatens future difficulties for the codes.

Strong arguments for planned economy may be urged particularly in a time of crisis. But consideration must also be given to the fact that such economy must be scientifically planned or it eventually defeats its own purpose. In regard to the petroleum industry it is obvious that neither code is the result of scientific research and planning, and as the result of parliamentary procedure, must be taken to omit certain vital elements for the welfare of the industry and to include certain others which may eventually prove harmful. Above all looms the fact that should not be lost sight of even temporarily—control of industry once relinquished to a politically minded government may be very difficult if not actually impossible to recover.

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$42,000,000 Worth of Mechanical Lifting

Decreasing Bottom Hole Pressures in East Texas Threaten to Remove the Field As a Disturbing Factor in the United States Petroleum Industry Within the Coming Year.

SINCE the discovery of the East Texas field early in 1931 the well-being of the entire United States oil industry has depended largely upon the daily developments in that pool. Crude oil and gasoline quotations in the past two and a half years have responded quickly to all increases and decreases in East Texas production, to shut-downs of the field and to various court decisions of proration suits as related to East Texas. In fact five different times in the last two years overproduction in East Texas has caused 25-cent per barrel sinking spells in crude oil prices throughout the Mid-Continent and eastern fields, each decline reducing the incomes of oil companies, landowners and states by some $500,000 per day, thus greatly affecting the purchasing power of large sections of the country and directly accentuating the depression. Similarly cheap gasoline, refined from the illegally produced East Texas crude, flooded motor fuel markets, causing record low prices, and locally entirely disorganizing distributing facilities of established concerns.

Therefore a careful forecast of crude oil and gasoline prices, future profits of oil companies with thousands of stockholders and of the extent of possible prosperity of large areas in the United States is necessarily dependent upon analysis of the East Texas field and its present potentialities.

The East Texas field produced to July 1, 1933, about 400,000,000 bbl., including in this total both legal and estimated unreported production. The East Texas pool covers 110,000 acres (172 square miles) and on July 1, 1933, there were in the field 10,500 producing oil wells, indicating an average cumulative per acre recovery of 3,640 bbl., and an average cumulative per well production to date of 38,100 bbl. The original static bottom-hole pressure in the East Texas field was about 1,630 lbs. per sq. in.; by July 1, 1933, the bottom-hole pressure declined to 1,190 lbs. per sq. in., indicating a drop of 440 lbs. per sq. in., or 60.2 percent of the margin between 1,630 lbs. and 900 lbs. estimated necessary for natural flowing of wells. The bottom-hole pressure drop has averaged to date 1.1 lbs. per 1,000,000 bbl. of crude oil produced. With an average cost of a completed well in East Texas being about $16,500, not including initial lease investment, and a probable average price received by independent producers not exceeding 30 cents per barrel, it is evident that gross return per well averaged to date only $10,020 (after subtracting 1/8-th royalty), or some $13,500 under estimated full cost, including the lease, the completed well and the producing expenses to date. These estimates indicate total East Texas lease investment and expenditures of about $250,000,000, and total revenue to date of about $105,000,000 (after subtracting 1/8-th royalty), this summary not including construction of hundreds of miles of pipelines, of various auxiliary plants, tank farms etc., and for independent operators not including the pipeline gathering charges. The indicated results obtained in the East Texas field to date will have much bearing on future developments in the pool, and on its influence on the oil industry in general.

Particularly important for the forecast of future production in the East Texas field are the developments in that field since April 25, 1933, when Texas Railroad Commission increased the allowable of the field to around 800,000 bbl. per day, and permitted the field actually to produce in excess of 1,000,000 bbl. per day. To realize, however, the full importance of recent developments it is necessary to

consider the subsurface conditions of the oil accumulation in East Texas.

The East Texas field is an areally huge sand lense oil reservoir, with the Woodbine sand pinching out eastward, and thickening westward. On the west side the production is limited by salt water, which was encountered at 3,320-foot subsea contour line at the time of the discovery. The sand in the East Texas field exhibits unusual permeability and the field therefore can be considered as a closely interconnected reservoir with oil and water moving with relative freedom through the sand toward zones depleted by production. Very little gas has been accumulated with the oil in East Texas and it is not considered as an important factor in flowing wells. One barrel of crude oil in the East Texas field averages only 375 cu. ft. of gas and all the gas is held in inactive solution at pressures above 740 lbs. per sq. in. Since the bottom-hole pressures are still considerably in excess of that figure the gas does not exercise any influence as a driving force within the sand at this time. Hydraulic pressure applied from the western edge of the pool is the principal driving force in East Texas, and therefore the flowing production of the field largely depends upon the closeness and consistency of contact between oil and water within the reservoir. Thus slow withdrawal of oil tends to keep advancing water as a continuous strong driving and flushing force, whereas rapid rate of production leaves water further and further behind, until oil, having but little gas, looses its driving force entirely, and the wells stop flowing. With the old rate of production, 350,000 bbl. per day, the bottom-hole pressures declined slowly, at the very moderate rate of 0.75 lbs. per sq. in. per 1,000,000 bbl. produced, but still indicating that water has been lagging and did not fully replace the oil withdrawn from the sand. With increased production, totalling 1,000,000 bbl. per day, from April 25 to June 12, 1933, the rapid rate of withdrawal left water considerably behind the oil with the resultant loss of the driving force and a rapid decline in bottom-hole pressures. Since April 25 the rate of bottom-pressure drop increased to 4.0 lbs. per sq. in. per 1,000,000 bbl. of crude oil brought to the surface; but later the rate improved somewhat to 2.5 lbs. per sq. in. per 1,000,000 bbl. produced, because the built up pressure due to total shut-down of the field prior to April 25 was lost at a relatively faster rate and because the production of the field gradually dropped from around 1,100,000 bbl. to 925,000 bbl. per day. The new allowable, effective June 13, 1933, of about 600,000 bbl. per day is not expected to result in much better showing and a drop of bottom-hole pressures of 1.75 to 2.00 lbs. per sq. in. per 1,000,000 bbl. produced is anticipated. Furthermore a considerable amount of water channeling is taking place with any allowable in excess of about 325,000 bbl. per day, resulting in shutting off permanently from wells millions of barrels of otherwise recoverable oil, the rate of channeling being directly related to the production in excess of 325,000 bbl. per day.

With bottom-hole pressure in the East Texas field on July 1, 1933, averaging 1,190 lbs. per sq. in. there is a margin of 290 lbs. left to flow wells naturally. At the estimated rate of drop of 1.75 lbs. per 1,000,000 bbl. of oil recovered, there will be produced in the field 165,500,000 bbl. of oil by natural flow in the next 276 days (about nine months) with production averaging 600,000 bbl. per day, the present allowable. After that time pumping will become necessary, though actually many wells will continue to flow for a much longer period, while others have already been pumping for several months, and many more will require mechanical lifting in the next few months. In fact, in July, 1933, there were already in the field at least 500 wells either off production or pumping, the actual number of non-flowing wells being impossible to ascertain due to the practice of producers to report all wells on their leases as producing naturally, and taking production from a few actually flowing wells; thus it is possible for a lease with nine dead wells and one flowing well to report all wells flowing, and to obtain the resulting higher allowance only from one remaining flowing well.

It is apparent, therefore, that gradually an increasing number of oil wells in the East Texas field will require pumping. The equipment for 10,500 wells will necessitate a major capital investment of about $4,000 per well, or a total of about $42,000,000. The size of the project may be more fully appreciated when it is realized that if all wells are put on pump in the East Texas field they will require 36,800,000 ft. of sucker rods, not including reserve and replacement stocks, or fully 31,000 tons of steel; also around 2,000 engine units will be required to furnish power. In addition, actual lifting costs, including supervision, labor and repairs, will probably average 20 cents per barrel lifted. Apparently not all operators will be financially capable, or willing, to make the additional investment, though in all probability improved crude oil prices will limit inactive wells to areas where pumping will be an unprofitable venture, and during the next twelve months to not over 1,000 wells located along the western and eastern edges of the field.

The potential production of the East Texas field as estimated by the Texas Railroad Commission, and based on two-hour flows of key wells through casing, is grossly misleading. The Commission estimates the daily potential of the field at 131,200,000 bbl., an average of 12,478 bbl. per well. Actually if all wells were opened in the East Texas pool the first day's production would be around 20,000,000 bbl., an average of 1,900 bbl. per well, while at the end of first 10 days it would have dropped to about 5,000,000 bbl., an average of 475 bbl. per well, at a tremendous sacrifice of possible ultimate recovery.

Summing up the recovery outlook of the East Texas field it can be estimated that future flowing production in the field will be 165,500,000 bbl., or a total flowing recovery of 565,000,000 bbl., equivalent to 5,140 bbl. per acre of its proven area. Recovery by mechanical means, gas lift (improbable because of absence of gas) and pumping, cannot be forecast with any accuracy, though 750,000,000 bbl. would appear as the upper limit over a period of many years. Thus the ultimate recovery of the East Texas field may be estimated at about 1,300,000,000 bbl., or at 12,400 bbl. per acre; that such an estimate is not too low is apparent if the East Texas field will be compared with somewhat similar fields in Oklahoma, more particularly the Burbank pool, where ultimate recovery will be not over 9,000 bbl. per acre, though estimates early in the life of that field placed the ultimate recovery at as high as 25,000 bbl. per acre.

The immediate effects of the gradual transition of the East Texas field to the pumping stage during the coming year will be:

> Necessarily restricted production resulting in: (a) elimination of East Texas as a competitive and destructive factor in northern Mid-Continent crude oil markets, which it enters via pipelines even at prices around 50 cents per barrel, and via tank cars when the price drops to 10 cents per barrel. It is estimated that between April 25 and June 13 probably fully 125,000 bbl. of East Texas crude oil was routed by pipelines and tank cars into Oklahoma and further north; (b) reduction of refinery runs in East Texas and consequent elimination of distress gasoline, which sold at as low as one cent per gallon for third grade, and thus could be brought north in tank cars and sold cheaper than local production; and (c) stabilization of crude oil and gasoline prices throughout United States, particularly influenced by pumping costs in East Texas, which will approximate 30 to 40 cents per barrel, including pump equipment and operation.

Greater success of effective proration in the

East Texas field, with both producers and Railroad Commission realizing the necessity of strict enforcement for conservation purposes, thus possibly paving the way for a production allowable of under 400,000 bbl. per day. Effective proration in East Texas would be immediately reflected in other prorated fields in Texas and in Oklahoma, which were difficult to handle principally because of the overproduction and cheap crude oil in the East Texas pool.

Ordering of vast amount of equipment for pumping wells, greatly increasing demand from various local and eastern factories, thus contributing to industrial recovery.

Increasing employment in East Texas.

▼

Royal Dutch Reports Profits of F28,303,692 for the Year 1932

BECAUSE of the large volume of its business and the broad scope of its activities the annual report of N. V. Koninklijke Nederlandsche Maatschappij Tot Exploitatie van Petroleumbronnen in Nederlandsche-India (The Royal Dutch Company) is a publication of widespread interest. It reflects the state of the industry in the world at large and presents a rather accurate cross section of the movement of events in the production of petroleum and the marketing of its products.

Royal Dutch Production

	1932 (Metric tons converted to barrels at 7 bbl. to the ton)	1931
Dutch East Indies	28,402,080	26,683,314
Sarawak	2,453,297	3,746,246
Seria (Brunei)	1,236,326	.....
Egypt	1,855,392	1,994,013
Roumania	8,719,690	7,837,452
Mexico	13,502,664	12,118,750
Venezuela — Caribbean	13,573,252	12,427,212
Venezuela — V. O. C.	33,496,127	34,291,544
Venezuela — Colon	5,879,398	7,199,500
Trinidad	880,222	1,139,908
United States		
(Shell Petr. Corp.)	17,348,366	18,952,633
(Shell Oil Company)	17,137,855	15,604,092
Argentina	2,412,641	1,734,642
	146,904,310	143,729,306

The company's report for the year 1932, which was published at the end of May, covers a period in which operating conditions were particularly difficult in all parts of the petroleum field because of financial disturbances, industrial depression, low prices and declining consumption of petroleum products. Under these conditions the realization of net profits amounting to F28,303,692 (equivalent to $11,321,477 at normal exchange) must be regarded as satisfactory. It compares with F27,916,-648 ($11,166,592) earned in 1931 and was sufficient to provide for a dividend of six percent on the ordinary share capital of F503,624,000 after payment of four percent on the preference shares. Profit and loss account for the year is shown in the accompanying table.

The strong position of the company is shown by the balance sheet as of December 31, 1932 which gives total assets as F1,200,635,278 of which F494,876,000 represented unissued shares, F312,094,011 was the cost price of shares in operating companies, F347,589,325 was in the form of claims on undertakings in which the company is interested, F2,896,386 consisted of cash and short term deposits and F10,944,500 was in the form of securities. Reserve was F67,366,011. The report points out that the liquid resources of the Royal Dutch group as of May 1933 were equivalent to over £51,000,000.

As usual the report comments on events of the year in the oil industry, describing the international conferences held in New York and Paris and discussing the obstacles in the way of international stabilization. In reference to Russia the report states:

Russia's home consumption increased from 11,900,000 tons (83,300,000 bbl.) in 1931 to 14,300,000 tons (100,100,000 bbl.) in 1932. Previous to 1932 the Russians had been accumulating considerable stocks of oil, on which they drew for their export business in 1932 and which allowed them, notwithstanding their decline in production and the increased home consumption which could no longer be prevented, to increase their exports from 5,-224,301 tons (36,570,107 bbl.) in 1931 to 6,011,299 tons (42,079,093 bbl.) in 1932. We may assume that by now those surplus stocks have been depleted, and that unless they succeed in substantially increasing their production they must be regarded by consumers as suppliers who on the export markets may very well run short of their supplies; in fact, during this year they have been buying benzine f. o. b. U. S. A. ports in order to meet their shortage, while tankers are delayed and have been known to wait no less than 25 days in the Russian Black Sea ports before they could be fully loaded.

Emphasizing the need of continuing efforts to arrive at an international agreement the report says:

It cannot be repeated too often how highly important it is that production and consumption should be balanced. It is a common error not to realize that by trying to find a market for commodities overproduced in spite of decreasing consumption, the overproducer is first of all competing with his own normal production; furthermore, when the price begins to fall as a result of such overproduction, profits do not diminish proportionately but far more quickly and soon disappear altogether: Given a selling price of say one dollar, with cost price 90 cents and profits thus 10 cents, it only requires a drop of 10 cents on the selling price to wipe out all profit. . . . The leading companies, who have taken the initiative in this movement, realize that in the future there will be a much greater demand for oil products and that with the proposed method of conservation not only can all demand be met for a very long period but also prices can be stabilized at reasonable levels instead of becoming liable to violent fluctuations. Nobody, neither producer nor consumer, and certainly not governments, can ever benefit from abnormal wastage of natural wealth which is not replaceable.

The experience of last year has shown that with such an enormous potential producing capacity as the oil industry has at its disposal today, it is extremely difficult to establish a really satisfactory balance between supply and demand when consumption is declining as it is at present. . . . A satisfactory solution for the oil industry, as for all other industries, can only be achieved if consumption commences to increase again, . . . On the other hand, the crisis will not begin to disappear until consumption increases, and that leads us to the opinion that only by bringing unemployed producers and underconsuming consumers together can the crisis be permanently overcome. In other words, purchasing power must be created and the remedy not sought in cheaper products obtained at the cost of less and/or cheap labor. This does not mean to say that under the present circumstances such cheap labor would not be required, but rather that the necessity is there solely because no attempts are being made to increase purchasing power. This, however, is a world problem and should be tackled on a world basis, not by restricting production and thus increasing unemployment, . . . but by increasing consumption by the creation of more demand, instead of reducing consumption more and more by continued deflation and everything connected with it.

Royal Dutch Profit and Loss Account 1932

Administration and other expenses	F 247,247	Dividends on shares in various companies	F 24,230,609
Service of 4% dollar debenture loan	1,000,000	Interest	10,898,389
Contractual obligations	26,880	Dividends lost by limitation	10,622
Interest on dollar debenture loan	3,978,750		
Difference in Exchange	1,583,051		
Balance of profit	28,303,692		
	F 35,139,620		F 35,139,620

Current Situation in Italy's Producing Fields

Existing Laws Tend to Retard Development. Modification of Regulations in Conformity with Technical Requirements will Encourage Producers and Have Beneficial Effect Upon Output.

SINCE the bulk of its petroleum supply is imported Italy is not usually regarded as an oil producing country. Yet, even the incomplete geological and geophysical studies made to date in this southern European country indicate that her ultimate resources may be sufficient to take care of a good percentage of domestic requirements for many years to come. These studies are being continued by both the government and by private companies, but are not yet generally accepted.

Nevertheless, Italy's modest oil field development has resulted in a substantial and steadily increasing output during the past few years, but, expert opinion affirms that the production has not amounted to anything like the quantity of high-grade crude that could have been obtained had some retarding factors been eliminated. At the same time it should be pointed out that even if production is trebled or multiplied tenfold it will not disturb the world market, as Italy is never likely to be an oil exporter, or even to rank among the major producing countries. These very facts make it desirable for her to have such laws and sympathetically-handled regulations as will encourage domestic production as near to the point of independence as is possible. This position would be invaluable in the event of war. Undoubtedly "oil independence" is the actual aim of the Italian government, although the objective is still some distance away. Once the ministers controlling petroleum affairs have a full appreciation of the causes checking this ideal, adequate governmental steps towards their elimination probably will be taken.

Unlike most other countries, Italy's petroleum consumption has been satisfactorily maintained during the world industrial disturbance, but the domestic output of crude oil still remains a small part of the total requirements. In 1932 Italy imported approximately 10,500,000 bbl. of crude and petroleum products compared with less than 250,000 bbl. internal production of crude. Undoubtedly the high tariff and taxes on petroleum produces a substantial revenue for the government, but these imposts are actually paid by the Italian consumer, and the balance of the cost goes abroad after the handling charges are deducted. If domestic production greatly increases and exports fall off, the government probably would want to tax the domestic product at the same rate. In that case practically all the cost of the oil would stay within the country, and the work of its production would increase national employment.

Domestic production of crude amounted to approximately 144,000 bbl. in 1931, of which the Societa Petrolifera Italiana's output was 96,000 bbl. The next largest producer is the Petroli d'Italia, controlled by the Banca Commerciale. Last year all production reached a total of approximately 220,000 bbl. of which the S.P.I. accounted for 171,000 bbl.

In many ways the most powerful oil organization in Italy is the A.G.I.P. (Azienda Generale Italiana Petroli) in which company the government is strongly represented. This company was formed originally to search for oil, and to hand over the petroleum territories (presumably at a reasonable figure) to independent Italian companies after oil deposits were located, and, secondly, to participate in the oil industry generally in order to keep prices low. For the purpose of enabling the A.G.I.P. to carry on geological, geophysical and drilling work an annual subsidy of 7,000,000 lire was granted by the government in 1927.

On March 15 it was reported that an important oil field had been discovered in Albania and that 200,000,000 lire had been appropriated for development work, which will include a pipeline to Valona, seaport on the Adriatic, and a refinery at that point.

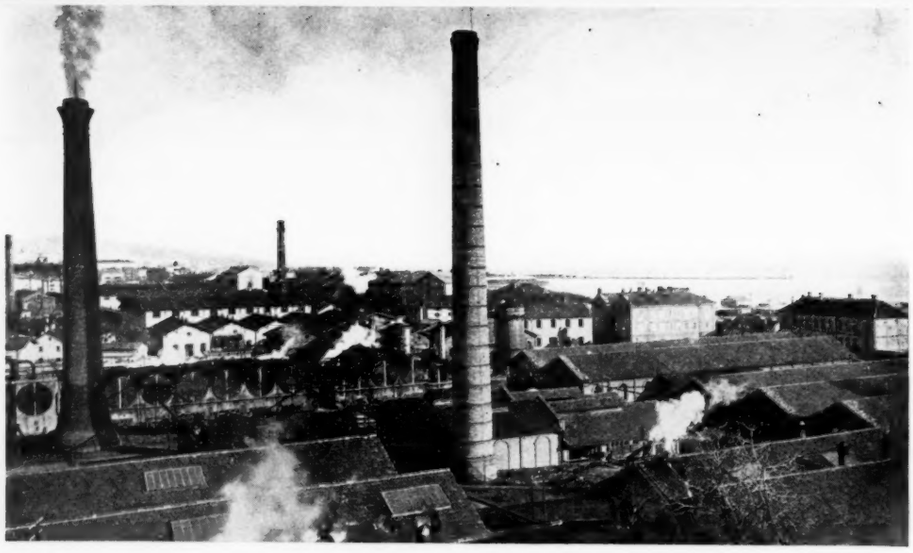
Part of the original grant to the A.G.I.P. was in cash and part in materials. The latter consisted of a large supply of drilling equipment made in Germany and Austria under the terms of war reparations. It was obsolete when collected in storage in Rome; nevertheless, the organization was obliged to use it to the detriment of its operations, especially as it was used under the direction of young Italian engineers who had made their studies in Roumania, and not in American oil fields where drilling engineering has led the world.

The first president of the A.G.I.P. was H. E. Conti, now president of the Banca Commerciale Italiana, Milan, which owns the Petroli d'Italia. He was succeeded by Ing. Giarrantana, a member of Parliament. The present head of the organization is H. E. Professor A. Martelli, who has been in office about a year.

Besides the A.G.I.P. there are three private companies now operating in Italy, namely—the S.P.I., the Petroli d'Italia and the Petroleum Italicum which as yet has no commercial production. It is reported that at least two foreign groups negotiating to enter Italy have failed to come to agreement with the Ministry of Corporations, which controls all national oil affairs, due to the terms not being sufficiently attractive. One reason apparently has been that tracts sufficiently large for proper prospecting were unobtainable under the regulations.

Some of the A.G.I.P.'s controlled areas amount to 30,000 hectares, yet the law says that individual sections allotted for petroleum prospecting shall not be over 2,000 hectares. This phase of the law is one of the several factors at present hampering private development. One of the independent companies has asked for 10,000 hectares as being the minimum on which proper geophysical and geological work can be done commercially. The Ministry of Corporations which is largely guided by recommendations from the A.G.I.P. regards this as too large an area, but is willing to divide the area required into three permits of 3,000 hectares. If the company accepted such a condition it would be obliged to drill on each of the three permits, which, in the opinion of experts, would be excessive and too expensive for exploring purposes.

In the Po valley there are excellent possibilities of oil in larger quantities than heretofore found in the country, but extensive geophysical work is essential. If such work was completed in six months to a year, and if the tract first was divided



Stills and warehouses of the Raffineria di Olii Minerali, S. A., at Fiume.

according to the law, there would be no assurance to the company that the promising areas would be free to be granted as prospecting permits, and another company by that time might have secured the drilling rights. From a technical and commercial standpoint it is essential that the prospecting company be allowed to carry on preliminary prospecting studies in much larger areas than ultimately will be drilled, and, with the assurance that as soon as these studies are completed prospecting permits of at least 3,000 hectares each will be granted. Only those with an intimate knowledge of the petroleum industry can properly appreciate the necessity for these steps, all of which take time and exhaustive care, and must have adequate protection. Undoubtedly, the Ministry keenly desires to give sympathetic and due consideration to all phases of the matter, and eliminate every restriction that really stands in the way of early extension of the search and production of oil. The acceptance in good faith of the technical representations of the responsible oil companies concerned will greatly assist in expediting the work.

Another hampering factor to private development is that a prospecting company, which can prospect where it likes provided it holds the permit, must send its research reports and maps to the Ministry of Corporations, members of whom are on the Board of the A.G.I.P. The Ministry submits the reports and maps to the A.G.I.P. and asks if the latter is interested in developing the tract under report before approving the research permit and allowing the independent company to begin operations. The A.G.I.P. can recommend to the Ministry any private company that it deems worthy. Presumably it also can advise against any company but the Ministry has the supreme authority with regard to granting permits. It should be made quite clear, however, that a permit for exploring, and later for drilling, has never been refused by the Ministry on tracts coming within the regulations. Yet that possibility always being present causes the position to be disturbing, particularly when it is realized that the A.G.I.P. has slowly changed from its original main purpose of searching for oil. It is now a producer, refiner, importer and marketer.

The commercial A.G.I.P. Company is independent of the research A.G.I.P. Company, and has a share interest in the B.O.D. Ltd., which is commencing exploring and drilling operations in Iraq and may eventually build a pipeline from Mosul to Alexandretta. It now imports free of duty Russian and Roumanian crudes, refines the same at Fiume, and markets the refined product in competition with the local production of domestic companies. Taxes on the A.G.I.P.'s products are virtually a matter of government bookkeeping, due to federal control of the company. It means that the government is always a competitor of any private producing and marketing company.

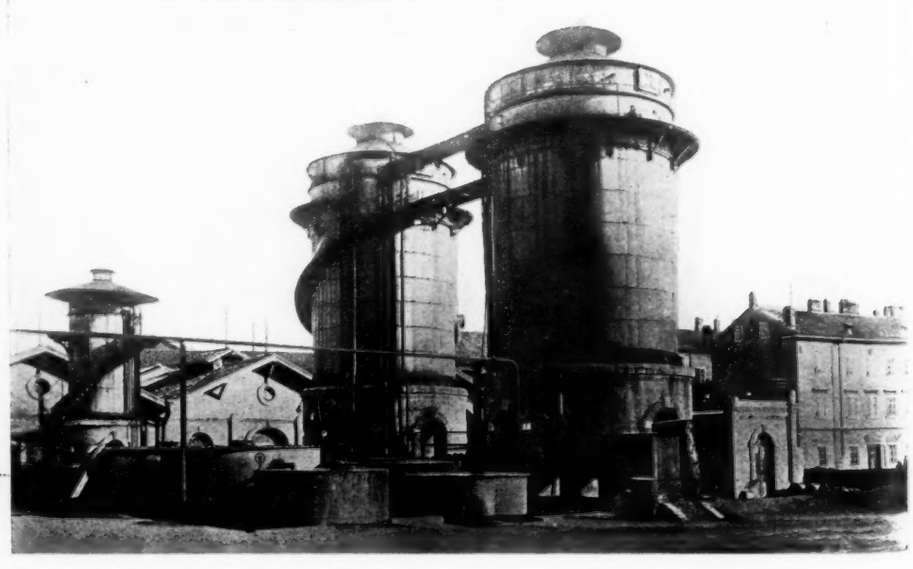
There appears to be little doubt that in a natural and justified desire to protect national interest, combined with an anxiety to produce oil, the Ministry of Corporations and the A.G.I.P. together have unintentionally and unconsciously prevented more rapid progress in developing Italy's oil resources. For instance, up to two or three years ago the producing companies were permitted to import up-to-date equipment needed for drilling, but the national industrial crisis almost stopped imports of drilling equipment from America. The government has since opened a special technical office in Milan where all orders for proposed equipment must be submitted, for approval before forwarding by the Ministry of Corporations, to the Ministry of Finance for the granting of permits for free import. This new technical office has a policy of submitting the specifications to Italian engineering companies, who have had little practical experience in manufacturing modern drilling equipment. If, however, these concerns state that they can make it locally, then a heavy duty is imposed should the purchase be made abroad. Petroleum engineers know how exacting the manufacture of such equipment must be, and that lack of actual experience with oil well equipment construction may result in serious operating trouble.

Some government authorities are urging the imposition of a royalty payment on crude oil. In view of the small quantity of oil produced per well this would seem an unjustified move.

Smoothing out of some of these difficulties, and modifications of the mining laws, are well within the power of the Ministry, and no doubt will be executed as soon as the officials are satisfied that these steps are the logical ones to take.

T. ORCHARD LISLE

Group agitators at the Fiume refinery of Raffineria di Olii Minerali, S. A.



Important Michigan Production

Development of Increasing Production, Proximity to Important Markets, and Regular Use of Acid Treatment Distinguish Michigan Field, Developed Since 1925.

IN 1932 with production of 6,925,665 bbl., Michigan was ahead of all eastern oil producing states with the exception of Pennsylvania. The oil industry of Michigan originated in the fall of 1925 with the development of the Saginaw oil field. At present there are in the state seven producing oil fields, three gas fields, five active refineries with a crude oil capacity of 18,500 bbl. per day, 125 miles of crude oil pipelines, and 56 miles of natural gas pipelines. Monthly production currently exceeds 500,000 bbl. Natural gas developments in central Michigan indicate a potential reserve of approximately 22,000,000,000 cu. ft.; daily potential open flow being over 100,000,000 cu. ft. About 95 percent of crude oil produced in Michigan to date has been recovered from limestone formations. Geological information points to the development of additional reserves.

History

AFTER the development of the Lambton County, Ontario, and the Lima, Indiana, fields interest was directed to the oil and gas possibilities of Michigan. Encouraged by gas seepages and "drift" gas in certain parts of the state, a number of wells were drilled in search for oil and gas. Oil was produced in small quantities near Port Huron from about 1898 to 1920 by the B. G. Xylite and Grease Company. Oil was found here in the upper part of the Dundee limestone at depths ranging from 500 to 600 ft. The daily initial yield varied from two to five barrels. In Monroe County in the southeastern part of the state showings of oil and gas were found in the Trenton limestone. Near Allegan in Allegan County, in the southwestern part of the state, a number of wells were drilled about 1900 which found some oil. In 1912 additional drilling was done in this area. Some of the wells had an initial daily production of from two to five barrels, but because of the depth, 1,300 to 1,400 ft., commercial development was not warranted.

In connection with the drilling done in the development of the salt industry in western and central Michigan, a number of showings of oil and gas were reported. The most important of these showings were at Manistee, Ludington, Muskegon and Mt. Pleasant.

Commercial production of oil in Michigan dates from the discovery of the Saginaw field in August, 1925. After the development of the Saginaw field, a number of major oil companies became interested in the oil and gas possibilities of the state. Wildcat drilling was stimulated. The result was the opening of two new pools at Muskegon and Mt. Pleasant, both of which were discovered in the fall of 1927.

Geology

THE SOUTHERN peninsula of Michigan considered as a whole is a broad structural basin. The drilling for oil and gas which has been done during the past several years now indicates the presence of important folds in the central part of this basin. The oil fields are localized to minor folds on the larger structural features. The larger folds have a general northwest-southeast trend with a steeper dip on the southwestern slopes.

Glacial drift, consisting of unconsolidated clays, gravels and sands, varying in thickness from 0 to 1,000 ft., covers most of the southern peninsula of Michigan. Information as to structure and nature of the underlying rocks must therefore be obtained from well records.

The accompanying areal geologic map, based on records of the Michigan Geological Survey, indicates the distribution of the formations which underlie the glacial drift. This map would represent approximately the surface outcrop after the glacial drift had been removed. The younger Pennsylvanian rocks are present in the center of the basin while progressively older formations are exposed as the rim of the basin is approached. The Dundee limestone, of Devonian age, is the important producing formation in the Muskegon and Mt. Pleasant fields. The Berea sandstone is the producing formation in Saginaw field. The Dundee is equivalent to the Onondaga limestone of Ontario, which has accounted for most of the production of the Petrolia and other Lambton County, Ontario, fields.

Saginaw

THE SAGINAW field is located in Township 12 North, Range 4 East, extending in a northwest direction from the west city limits of Saginaw. Up to February 1, 1933, the field had produced a total of 1,096,600 bbl. of oil. The present daily production is about 175 bbl. from 125 wells. Production is found in the Berea sand at from 1,800 to 1,900 ft. A few wells have encountered small commercial production in the Traverse and Dundee limestones. The Saginaw field to date has accounted for about five percent of the state's total production and is the only field in Michigan producing from a sand formation. The proven area, fully developed, covers about 2,000 acres.

Muskegon

UP TO FEBRUARY 1, 1933, the total production of the Muskegon field was 5,834,000 bbl. Daily output now is about 1,000 bbl. This field is located adjacent to the city of North Muskegon. Partly because of such location, the peak development of the field in 1928 and 1929 resulted in excessive town-lot drilling. The field, which covers about 900 acres, has 439 completed wells. Three oil and gas horizons were found, one in the top of the Traverse formation at 1,600 ft., one near the bottom of the Traverse at 1,900 ft. and a third in the Dundee limestone between 2,000 and 2,100 ft. The best production has been developed in the Dundee limestone.

Mt. Pleasant District

THE MT. PLEASANT district includes the following oil pools: Mt. Pleasant, Vernon, Leaton, and the new development southeast of Mt. Pleasant, referred to as the Yost-Porter area.

Location of these pools is shown on the accompanying map. The Vernon, Leaton and Mt. Pleasant pools are located on the same general structure. The Yost-Porter production is on a different structural fold, as this field is separated from the Mt. Pleasant production by structurally low wells which were dry in the Dundee limestone. Mt. Pleasant field is the largest individual pool in the state. The discovery well was drilled by the Pure Oil Company in the fall of 1927. The location, which was in Section 18, Township 14 North, Range 2 West, was decided upon after the Pure Oil Company

had mapped an anticlinal structure in the area from salt well records furnished by the Dow Chemical Company. The field, as now developed, is about eight miles long and 1½ miles wide. The proven area covers about 8,500 acres. Production in the Mt. Pleasant and other fields of the central Michigan area is from the Dundee limestone of Devonian age. Some geologists consider the producing formation in the Vernon field to be the Monroe limestone, with the Dundee absent in that locality.

The depth to the producing portion of the Dundee varies from 3,500 to 3,700 ft. in the Mt. Pleasant and Leaton fields. In the Porter area the Dundee limestone is reached at about 3,400 ft. The oil is found from 20 to 70 ft. from the top of the limestone. The majority of the wells have two "pays" and some in the eastern part of the Mt. Pleasant pool have four. Due to varying degrees of porosity there is a great difference in initial production, small wells can be offset by wells making 2,000 to 3,000 bbl. per day. The best wells have been drilled in the eastern part of the Mt. Pleasant pool in Sections 9, 10, 14, and 15. Pure Oil Company's No. 1 Bernard in Section 9 had an initial production of 3,500 bbl., this well up to March 1 of this year having produced 300,000 bbl.

Analysis of Mt. Pleasant Crude Furnished by Pure Oil Company

	Percent
Gravity	42.8
Viscosity (at 70 deg. F)	39
Untreated Gasoline	38.16
Untreated Kerosene	9.42
Gas Oil	22.73
Cracked Wax Distillate	11.52
Wax Distillate Bottoms	.57
Cylinder Stock	15.00
	97.40
Loss	2.60
	100.00

New production is now being developed south and southeast of Mt. Pleasant pool in what is referred to as the Yost-Jasper-Porter area. This Dundee development has taken place during the past three months. Structural indications suggest that these pools may connect into one long narrow field from Yost to Porter. Two or three separate pay zones are found in the Porter area but in the lower zone water is closely associated with the oil. The Porter development to date has been marked by rapid decline of production and great variability in initial yield. The best well in the Porter field to date has been Pure Oil Company's State-Porter No. 1 in Section 15, Township 13 North, Range 1 West. This well had an initial production of about 5,000 bbl. per day. Under back pressure the well is now producing 2,300 bbl. daily.

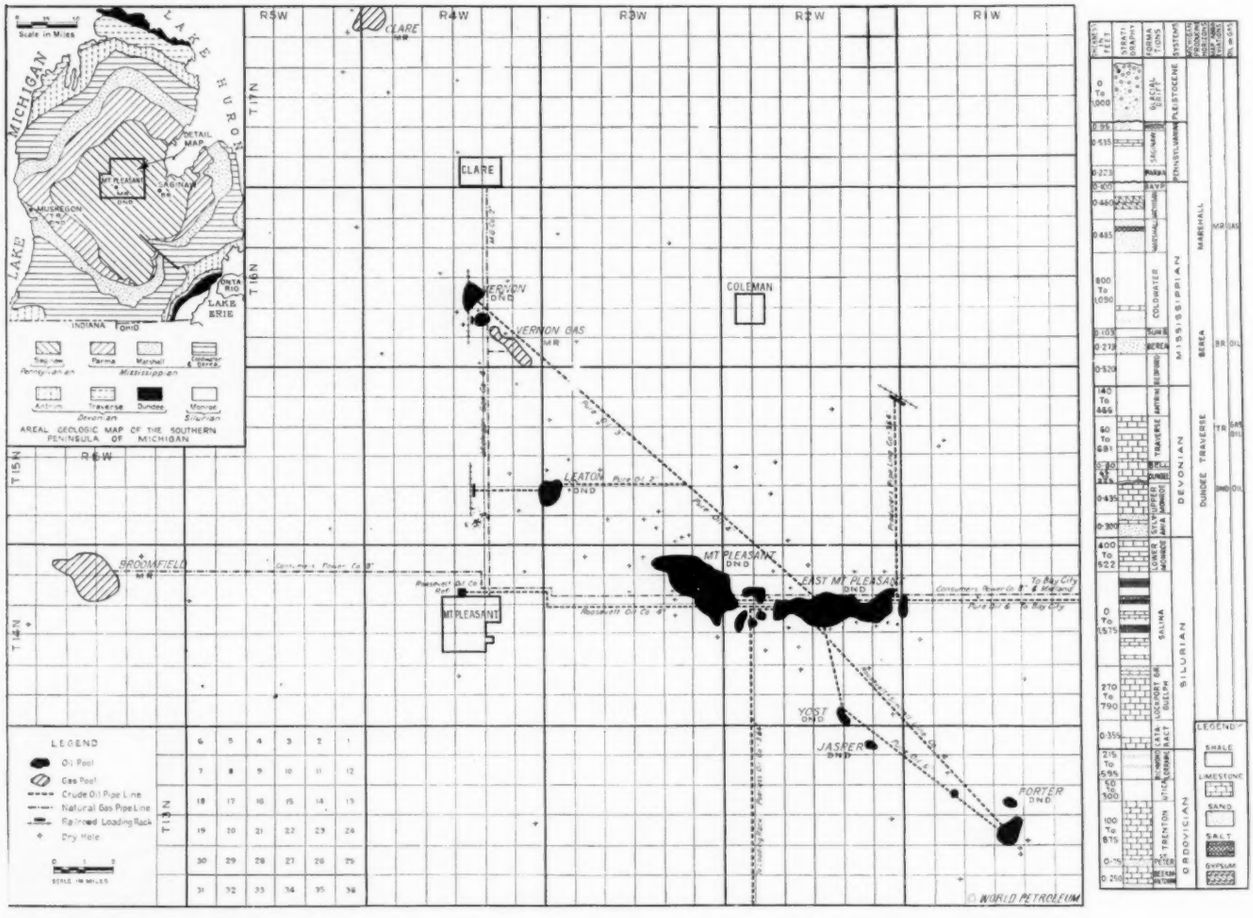
Statistics

THE AVERAGE ultimate yield per acre in the Mt. Pleasant field is estimated at 5,000 bbl. Individual leases, however, have already produced over 15,000 bbl. per acre. These leases are located in the East Mt. Pleasant field where the Dundee limestone has a higher degree of porosity.

The average cost of a completed well in the Mt. Pleasant district is about $18,000.

The State of Michigan up to February 1, 1933 has produced 20,942,000 bbl. of oil in the eight years of its existance.

Areal geologic map of Central Michigan.



Principal producing field in Central Michigan.

About 75 percent of the production in the Mt. Pleasant district is purchased by the Pure Oil Company, the oil going through that company's pipeline to Bay City and then by tanker to Toledo. Lake port refineries receiving Michigan crude are located at Chicago, Toledo, Sarnia (Ontario), and Cleveland. At Muskegon, the Dixie Oil Company (S. O. Indiana) has a pipeline from the field to the lake front to accommodate tankers.

Michigan Production by Years

1925	4,000
1926	94,000
1927	439,000
1928	594,000
1929	4,597,200
1930	3,966,600
1931	3,760,000
1932	6,925,700

Michigan Production by Fields to Feb. 1933

Saginaw	1,096,600
Muskegon	5,834,000
Porter Township	8,600
Vernon	614,700
Leaton	701,900
Mt. Pleasant	12,650,400

Michigan Production by Fields, March 1933

Mt. Pleasant Field	335,337
Leaton Field	23,360
Vernon Field	26,012
Yost Field	16,945
Porter Field	8,626
Muskegon Field	25,147
Saginaw Field	3,074

The Pure Oil Company has in Michigan about 80 miles of pipelines, fifteen 55,000 bbl. storage tanks, eight of which are at the terminal at Bay City, and about 100,000 bbl. of small storage in the field. The 38.7-mile, 6-inch pipeline to Bay City has a daily capacity of 9,000 bbl. at 600 lbs. with a maximum capacity of from 15,000 to 17,000 bbls.

There are five active refineries in Michigan with a daily crude oil capacity of 18,500 bbl.

The present price of Michigan crude posted by the Pure Oil Company is 75 cents per barrel, the price having been recently reduced from 95 cents.

Natural Gas

DEVELOPMENT of the natural gas reserves of the Central Michigan area has been slow due to lack of adequate pipeline connections to consuming centers. Three separate gas fields have so far been developed: the Clare, the Broomfield and the Vernon, their location being shown on the accompanying map. The gas sand which is found from 1,300 to 1,450 ft. is considered to be a lenticular sand in the lower part of the Michigan series, just above the Marshall. Initial well production has varied from 250,000 to 11,700,000 cu. ft. per day. The sand averages about 12 ft. in thickness, while rock pressure averages 580 lbs. Present daily open flow is about 105,000,000 cu. ft.; 20,000,000,000 cu. ft. represents the current estimate of potential gas reserves. There are 33 producing gas wells located as follows: 16 in Broomfield, 9 in Vernon and 8 in Clare.

The cost of a completed gas well in the Mt. Pleasant district is about $8,000.

The Consumers Power Company operates an 8-inch welded pipeline from the Broomfield pool to Midland and Bay City. That company supplies Midland and Bay City with natural gas and the Gas Corporation of Michigan serves Mt. Pleasant, Clare and Rosebush through its lines from the Vernon field.

The gas reserves thus far developed do not warrant additional pipeline construction calling for large gas withdrawals. Since only 25 percent of the daily open flow may be withdrawn in one day, the present fields could supply about 27,000,000 cu. ft. per day.

The central Michigan area has possibilities of developing additional gas reserves. There has been very little exploration outside of the territory close to the Mt. Pleasant field. Recently a wild-cat well in central Mecosta County, about 30 miles west of Mt. Pleasant, tested 4,000,000 cu. ft. of gas in Michigan sand at 1,485 ft.

Acid Treatment

WHEN PRODUCTION declines in Michigan fields it is now the regular procedure to treat the wells with acid. About 400 wells to date have been given acid treatment. This treatment has resulted in an average increase in production of 412 percent.

In 1927 acid was used by the Dow Chemical Company on the Marshall sandstone cap rock in some of its brine wells, but the results of this were unsatisfactory. The first experiments in treating oil wells with acid were conducted in January and February of 1932 in the Mt. Pleasant field by the Pure Oil Company in cooperation with the Dow Chemical Company. About 25 wells were treated before the method was generally known and before treating of other wells by Dowell, Incorporated, a subsidiary of Dow Chemical Company, was begun on a commercial scale.

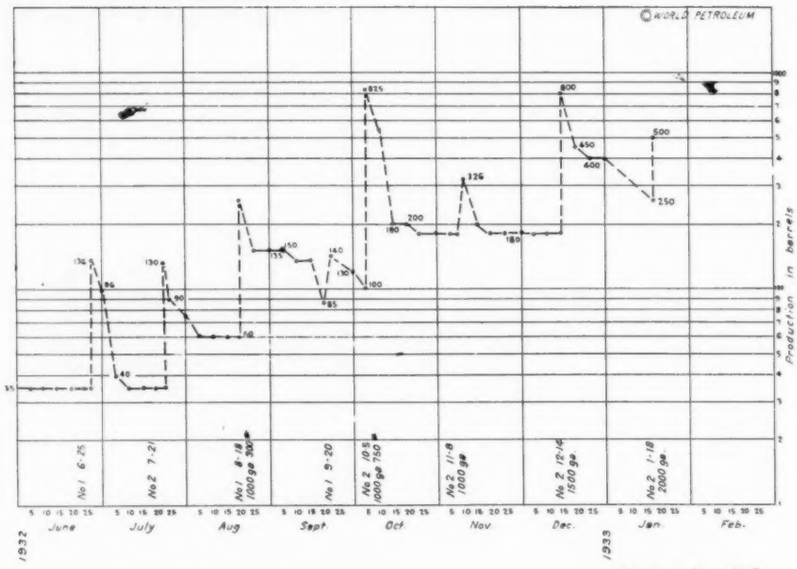
The accompanying curve shows the production increase of Dundee limestone lease, having two wells, after several acid treatments.

Future Outlook

ACCORDING to Dr. R. B. Newcombe of the Michigan Geological Survey, there has already been spent about $30,000,000 in the development of the state's oil and gas industry. The favorable location of the state in the center of a large market for refined products will stimulate further exploration. A number of large industrial cities from 75 to 125 miles from the center of the developed gas fields will provide a ready market when proven reserves warrant additional pipeline construction.

Possibilities are good for the development of additional oil and gas fields, especially in the central Michigan area. A

Wells in the East Mt. Pleasant field.



Courtesy, Dowell, Inc.

Production curve of Marthey lease, with two wells, in Leaton Pool, Central Michigan, after general acid treatment.

number of major structural features can be mapped there from sub-surface data. Local folds, when found on these larger structures, should be favorable for commercial oil and gas accumulation. Deeper drilling will probably uncover additional commercial production in older rocks.

Some geophysical work has been done in Michigan consisting mostly of magnetometer surveys, though the seismograph has been used to a limited extent. The drilling based on magnetometer surveys has been disappointing. No wells located solely on seismograph work have been drilled.

The Pure Oil Company has been most active in exploration and development work in Michigan. The Pure Oil Company at present has under lease about 500,000 acres which includes nearly 85 percent of the proven and prospective acreage in the Mt. Pleasant district.

▼

Less Drilling Results in Greater Production for Trinidad in 1932

OFFICIAL REPORT of the Trinidad oil industry for 1932, recently issued, discloses a further curtailment in drilling amounting to 20 percent, a slight increase in the value and volume of production, an increasing number of flowing wells and an increase in the total amount of oil refined on the island.

A further curtailment of drilling operations during 1932 resulted in a total of 173,287 ft. having been drilled as compared with 218,642 ft. in 1931, representing a decrease of 20.7 percent.

Of this total, 111,730 ft. were drilled on Crown Lands and 61,557 ft. on Private Lands, 41 wells being drilled on the former and 20 on the latter, making a total of 61 wells drilled for the year, oil being struck in 46 of these latter wells.

The total number of wells drilled in the colony up to 31st December, 1932 was 1,902, of which 1,197 were on Crown Lands.

Type of Producing Wells, Trinidad 1932

Flowing	215
Pumping	469
Swabbing or bailing	81
Air or gas lift	15
Displacement pumping	6
	786

At the close of the year there were 16 operators actively engaged in the production of oil as against 14 at the end of 1931.

A feature of the year's drilling was the use of an electrical instrument for checking up strata drilled in a well. The apparatus is now being generally run in most of the wells on the island and, in some cases, it is also used as a check to mechanical coring, while, in others, it is entirely relied on for placing the perforations in the oil string.

A total of 10,023,780 bbl. of crude oil were produced, of which 5,610,901 bbl. were produced from Crown Lands, paying the Government a royalty of $432,256.00 —compared with $405,824.00 in 1931.

The value of the crude oil produced during 1932 was $6,618,504 as compared with $6,410,097, the value of 9,743,502 bbl. produced in 1931.

It is pointed out in the report that the increase in the number of flowing wells from 185 in 1931 to 215 in 1932 is chiefly due to the increased use of tubing to bring in a new well, which prolongs the flowing life of a well considerably.

This use of tubing, states the report, together with more attention given to the older producing wells, considerably reduced the number of feet required to be drilled to maintain the Colony's production, despite the fact that in some areas drilling had been carried out further down the flanks, necessitating deeper wells.

Of the total production of the colony 63.8 percent was obtained from the Fyzabad area. Among the companies operating in that district, the Apex (Trinidad) Oilfields, Ltd. is the largest producer in the Colony.

The total amount of oil refined in the colony was 7,635,296 bbl. as against 6,899,144 bbl. in 1931.

The United British Oilfields of Trinidad, Ltd. have nearly completed the erection of a new refinery at Point Fortin. This refinery will have a capacity of 7,000 bbl. of crude oil per 24 hours.

The same company has under construction a pier about 8,500 ft. long for the purpose of facilitating the loading of vessels drawing 30 ft. of water, and this is expected to be completed during the current year.

Empire Preference to Come Up in July

ANOTHER attempt to obtain empire preference for Trinidad Oil is expected to be made in July this year when the 13th Congress of the Federated Chambers of Commerce of the British Empire meets in London.

It will be remembered that at the Ottawa Conference held in July last year strong representation was made on behalf of Trinidad oil but, so far, no satisfactory results have been achieved.

The Trinidad Chamber of Commerce recently forwarded a Resolution for consideration at the Empire Congress requesting the government to take steps to give preference to Empire petroleum.

ARDEN F. PRESCOD

Survey of Central European Markets

High Taxes and Encouragement of Domestic Refining Industry is the Policy in Austria Hungary, Czechoslovakia and Yugoslavia According to a Survey by M. David Gould.

THE AUSTRIAN market for oil products amounts to about 1,750,000 bbl. a year, practically all covered by imports. The export trade, except to a limited extent in lubricants, is insignificant.

Over half of the domestic requirements are met by local refining, but this is rather deceptive unless local conditions are understood. The "crude oil" reported among the imports is a so-called "artificial oil," a blend specially imported to comply with tariff requirements. On this basis, the refining capacity of the country is 1,231,800 bbl. annually (the figure of 5,128,950 bbl. given in the latest summary of the U. S. Department of Commerce is based on an obvious error in giving the largest plant a capacity of 4,500,000 bbl. instead of 450,000). This is the Shell-controlled plant at Vienna-Floridsdorf. The Roumanian Creditul Minier leases the second largest plant, with 280,000 bbl. annual capacity and operates another refinery formerly affiliated with Polish interests, with a capacity of 212,000 bbl. Vacuum Oil has a small shell and steam still refinery at Kagran, with a capacity of 105,000 bbl. a year. Altogether there are seven refineries in the country. All of the so-called "artificial oil" imported for refining comes from Roumania.

Gasoline imports, amounting to some 420,000 bbl. annually, come from Roumania to the extent of 57 percent; from Russia, 37 percent. Kerosene is a relatively small tonnage item; 38 percent of the imports are from Russia, 36 percent from Roumania, 15 percent from Poland and 11 percent from Persia. The imports of gas oil have been increasing in spite of the crisis—about 70 percent come from Roumania, 15 percent from Poland.

The tax spread which has led to the artificial encouragement of the refining industry in Austria may be summarized as follows: Tariffs and sales tax together amount to 4.48 schillings per 100 kilograms (equivalent to 80 cents a barrel at par or 64 cents with the current discount on Austrian currency); the combined taxes on kerosene are 11.30 to 20.10 schillings per 100 kilos, and for gasoline 42.15 schillings, including a special gasoline tax of 30 schillings per 100 kilos.

The filling-station price for gasoline is 53 groschen per liter in Vienna (reduced from 57 groschen last November), with a spread up to 7 groschen a liter additional in more distant provinces, equivalent to some 25–30 cents a gallon. There are about 2,900 filling-stations with built-in reservoirs in the country, together with some 1,500 of the characteristic "travelling pumps."

From time to time there has been a revival of talk about the introduction of a government-controlled gasoline monopoly in Austria, aggravated by the competitive situation, but so far this has not materialized, and is unlikely to in the near future under the present tense political situation.

Like many other European countries, Austria has been furthering by law the mixture of alcohol with gasoline. Such a law was passed in 1931, and began to be put into effect last year; it provided for the use of domestically-produced alcohol of 99.5 percent purity to be used in the proportion of not over 25 percent of the gasoline mixture, but the use of alcohol is not to be obligatory unless alcohol is selling for less than gasoline.

In addition, there is a domestic production of benzol ranging from 3,000 to 3,500 tons a year, which is used in a fuel containing 40 percent benzol and 60 percent gasoline and selling at 15–20 percent premium above straight gasoline.

The market for gasoline is being further reduced by the high prices, the automobile tax, the effects of the crisis in reducing the number of cars registered, and the Austrian custom of laying up cars for the winter to avoid registration tax for the period. As of September 30, 1932, for instance, there were registered 91,015 vehicles—17,960 passenger cars, 15,602 motor trucks, and 39,423 light and heavy motorcycles among them. By the end of the year the registration had been reduced by 20 percent, in addition to a loss of 2–3 percent due to permanent loss of registration.

Hungary

IN HUNGARY the policy of encouraging domestic refining by establishing a wide tariff spread against imported oil products has been carried to even greater extremes than in Austria. About 90 percent of all the oil imported into Hungary is crude. This has resulted in an overexpansion of refining capacity in Hungary which bears down on the domestic market, exports to neighboring countries being limited by their application of a similar policy.

There are nine refineries in Hungary, with an aggregate capacity of 2,219,000 bbl. The largest is Vacuum Oil's installation near Budapest, with a capacity of 245,000 bbl. of crude annually; then comes a Shell subsidiary with 490,000 bbl. annual capacity.

As against this capacity, total imports in 1930, the biggest year, were 1,740,060 bbl. and for the fiscal year ended August 31, 1932, the entire domestic consumption was 965,426 bbl. In other words, only about 25 percent of existing refinery capacity was being utilized.

Crude oil comes in duty-free, while gasoline pays 12–14 gold crowns per 100 kilos (equivalent to $3.30 to $3.70 a barrel), except for heavy naphthas, which pay 6.20 crowns to the barrel, the same as kerosene. On top of this, light gasoline (up to 0.735 sp. gr.) pays 32 gold pengö per 100 kilos specific tax, whether imported or shipped from a Hungarian refinery, and in addition there are municipal taxes and sales turnover tax to be reckoned with.

Moreover, gasoline ranging from 0.735 to 0.775 sp. gr. must be mixed with 20 percent of alcohol to form the mixture called "Motalko" which is the standard automobile fuel of Hungary; gasoline used for agricultural purposes or in the chemical industry does not have to be so mixed.

The filling station price of straight gasoline in Budapest is 0.52 pengö per liter, of "Motalko" 0.42 pengö, equivalent to 35 and 25 cents a gallon respectively.

Competitive conditions have led to the formation of a cartel of oil companies to

Quantity and Value of Austrian Imports
First three months of 1932 and 1933

	1932		1933	
	Barrels	Thousands of schillings	Barrels	Thousands of schillings
Crude (Artificial) oil	120,176	1,385	230,244	2,362
Motor fuel	70,700	1,323	62,951	1,158
Kerosene	28,532	388	25,767	316
Gas oil	33,159	311	56,357	642
Lubricating oil	9,478	625	11,123	653

regulate the price, but this cartel has not been able to prevent a drop of some 0.07 pengö in the filling station price in recent months.

Of the estimated 1,000 filling stations in Hungary, about 150 are in Budapest, the rest in the provinces.

Hungarian Consumption by Products

(Barrels)

	Sept. 1932–Jan. 1933	Sept. 1931–Jan. 1932
Light gasoline	16,597	27,776
Heavy gasoline	7,987	10,311
Agricultural gasoline	6,244	6,629
Motalko	114,828	111,741
Kerosene	157,423	155,043
Tractor petrol	43,561	48,195
Gas oil	47,999	50,953
Tax free gas oil	16,646	17,794
Lubricating oil	26,551	34,776
Other products	8,176	13,713
Total	446,012	476,931

Czechoslovakia

OF THE CENTRAL European countries to be considered here, Czechoslovakia has the largest developed production, amounting to some 91,000 bbl. a year, although interesting drilling operations are going on at Zistersdorf in Austria which have so far led to one productive well. The leading Czech fields are in Göding and Gbely, which are being extended by deep drilling and extensive tests.

As against current imports of oil products of about 3,000,000 bbl. annually, the twelve Czechoslovakian refineries have a combined capacity of 3,885,000 bbl. throughout annually. The largest, belonging to the Fanto interests which are widespread throughout this part of Europe, has a capacity of 1,295,000 bbl. annually; next is the Vacuum Oil plant at Kolin, of 700,000 bbl.; the Odra refinery of 630,000 bbl. and the two Apollo plants at Bratislav and Weikersdorf are the largest of the others.

Crude oil is imported free of duty, but refined products carry duties ranging from 33 crowns per 100 kilos for gasoline to 100 crowns for paraffin, as well as a heavy burden of other taxes.

Czechoslovakian Taxation

Crowns per Barrel

	Gasoline	Gas Oil	Lubricating Oil
Tariff	41.25	47.14	51.43
Surtax	50.00	28.57	73.43
Consumption tax	93.75	21.43	21.43
Turnover tax	16.93	8.57	20.73
Total taxes	201.93	105.71	167.02

The tax burden on gasoline is therefore equivalent to about $6.90 a barrel or 16 cents a gallon. The filling-station price in Prague, taking account of the price increase of 14 percent put into effect on January 1 of this year, is 2.90 crowns per liter, or about 35 cents a gallon.

Gasoline distribution in Czechoslovakia is coordinated by a cartel organization, which, however, although called the Union of Czechoslovakian Mineral Oil Refineries, does not determine quotas but merely sets up a general obligation to adhere to definite minimum prices. There are about 5,025 filling stations in the country, the greater part controlled by two domestic firms, the Zikmund Brothers and the Naftaspol, and the Vacuum Oil Company. While drilling has been actively carried on in a number of fields production from the Gbely field and to a lesser extent, the Hodonin field remain the only ones of commercial value, the former providing during the past four years 250 bbl. per day.

Imports for 1932 amounted to 2,669,288 bbl., a decline of only half of one percent below 1931. Of this, 34 percent came from Russia (principally gas oil and gasoline), 25 percent from Roumania (mostly gasoline, which constitutes 40 percent of Czechoslovak imports of this product), 16 percent from Poland (principally kerosene and some heavy oils).

Of the total imports, 60 percent consisted of gasoline, 25 percent of crude oil, 9.6 percent of kerosene, and 5 percent of lubricating oils.

In addition to the typical requirement of the mixture of 20 percent ethyl alcohol since last November compulsory admixture of two percent by volume of methyl alcohol has been required.

Yugoslavia

THE MARKET for oil products in Yugoslavia amounts to something under 630,000 bbl. annually under present conditions, of which over half consists of crude oil and residues. These are treated in six refineries with a total capacity of 1,808,800 bbl. annually. The two largest belong to the Standard Oil Company of Yugoslavia, having 630,000 and 490,000 bbl. of annual capacity respectively; English capital is interested in two plants of 350,000 and 280,000 bbl. Domestic production of crude is insignificant, and there is a small amount of natural gasoline from a natural gas field near Zagreb.

Crude oil is imported subject to a duty of 47.14 to 62.85 dinars per barrel. (1 dinar equals 1.76 cents at par, about 1.35 cents actually), while gasoline duty ranges from 204 to 471 dinars per barrel, kerosene from 79 to 110, gas oil 126 to 157, and lubricants 204 to 471.

In 1933 imports totaled 988,974 bbl. by far the largest source of supply being Roumania shipping in 85.94 percent of the total. Italy supplied 6.49 percent and the United States 3.69 percent, mostly lubricants. Gasoline imports comprise over 9 percent of total imports, kerosene 19 percent, asphalt 40, gas oil 10, crude 16 and lubes four percent.

Filling-station prices vary widely from town to town, because of the wide differences in transportation conditions (water, rail, tankwagon and truck according to location). The most recent price list shows variations from 5.20 dinars a liter in Belgrade to as high as 6.95 in the provinces (from 28 to 36 cents a gallon).

Bulgaria

BULGARIA likewise has practically no domestic production of crude, but unlike the other countries described here, it has only a small domestic refining industry represented by one plant with an annual capacity of 35,000 bbl. of crude. The latest available figures for a year's imports, those for 1932, show a total importation of 499,310 bbl. of oil products, against 523,573 bbl. in 1931. Of this 71.25 percent came from Roumania, for reasons indicated by Bulgaria's geographical situation and the easy access via the Black Sea from the Roumanian oil port at Constantza. Of the total imports, 12 percent consisted of gasoline, 34 percent kerosene, 34 percent gas oil, 6 percent lubricants, and 6 percent fuel oil.

Taxes are high, amounting for gasoline to 586 to 669 levas per barrel (the leva is about 0.6 of a cent) for duty alone, and including other taxes to 1173–1356 levas per 100 kilos.

There are about 120 filling stations in the country, at which the price is 6½ to 7 levas per liter (15–16 cents a gallon).

Last year the merger of four of the larger distributing organizations of the country straightened out the competitive situation.

A Correction

A MISAPPREHENSION may have arisen in regard to an ambiguous statement in a circular letter sent to a limited number of American firms with reference to the special supplementary issue of WORLD PETROLEUM to be published in connection with the World Petroleum Congress being held in London this month. Unfortunately the impression was created that WORLD PETROLEUM had an exclusive agreement with the Institution of Petroleum Technologists concerning the publication of preprints of technical papers to be presented at this meeting. In addition the name of the Institution of Petroleum Technologists was incorrectly given as "The International Petroleum Technologists Society." WORLD PETROLEUM wishes to take this opportunity to express its regrets to the Institution.

U. S. Tariff Has Little Effect on Venezuela

Ministry of Industry's Annual Report Indicates That Only a Small Decrease in Production Is Traceable to U. S. Tariff. ***By C. N. Clark***

ANNUAL REPORT of the Venezuelan Ministry of Industry, presented to the National Congress now in session, exhibits a satisfactory development of the petroleum industry during the year ended in June, 1932, despite the persistence of the economic crisis which has affected the world at large.

Crude oil production during the year amounted to 119,596,512 bbl. (seven barrels to the metric ton), as against 120,343,104 bbl. for the preceding year. Of this production there were exported to foreign destinations, including the producers' refineries at Curacao and Aruba, 113,201,361 bbl., compared with exports for the preceding year of 110,308,016 bbl.

The Lago Petroleum Corporation (Jersey Standard) leads all Venezuelan companies in the volume alike of production and of exports. Its report, included within that of the Ministry, estimates the company's concessions and areas as 2,122,795 acres, the largest section being in the bed of Lake Maracaibo consisting of 1,684,385 acres.

The Colon Development Company Ltd. (Royal Dutch-Shell) concessions in the state of Zulia yielded a substantial increase of production over that of the preceding year, the output amounting to 5,878,971 bbl. as against 3,351,423 bbl. for the year 1930-31.

The Venezuelan Oil Concessions Ltd. (Royal Dutch-Shell) areas in the Bolivar district of the state of Zulia continue to exhibit a seemingly inexhaustible deposit of petroleum; and although not noted in the report under consideration, being an occurrence of the current year, it is of interest to record that the company recently brought in its 500th well in the La Rosa field.

Imposition of an import tax on petroleum imported into the United States resulted in a diminution of only 0.62 percent as compared with the year 1931, despite gloomy apprehension at the beginning of the year.

On the other hand, petroleum activities, far from being discouraged by reason of the depression, exhibited a visible gain in the course of the year. Proof of this is the definite organization of the new field of Cumarebo, exploited by the Standard of Venezuela, which contributed more than 1,750,000 bbl. of increased production to the Venezuelan output for 1932, and this although the field was in full operation for but eight months. During the year 62 oil wells were completed, of which number but 12 proved to be dry or commercially unexploitable. At the close of the year, there were 18 wells in process of drilling, several of which have since come into production.

The tariff law of the United States of North America was declared in effect on June 6, 1932 fixing a tax on crude of .05 cents per gallon and 2.5 cents per gallon for imported gasoline.

The definite imposition of such a tariff by the United States necessarily reacted upon the products of Venezuela, resulting in the exports of petroleum by the companies exploiting the areas of the state of Zulia reaching 11,235,077 bbl. and 9,552,690 bbl. in May and June 1932 against the same companies' exports for July and August of 7,608,468 bbl. and 7,321,013 bbl. respectively. On the other hand, production figures for the last months of 1931 with those of the same months of 1932 show a monthly diminution, in the case of the areas for the state of Zulia, of some 630,000 bbl. Such reduction is abundantly compensated by the acquisition of new markets for Venezuelan petroleum, situated outside the United States.

During the year 1932 three new companies were registered in Venezuela, engaged in the petroleum industry, viz.: Alamo Oil Corporation, Bolivar Oil Concessions Company and the Monagas Oil Corporation. At the end of the year 125 corporations engaged in the industry were registered in Venezuela.

Revenue realized by the government of Venezuela from the mining industry, the major part of which is derived from the petroleum companies, amounted to 50,882,620 bolivars, or at par, $9,785,120, approximately 27 percent of the government's total revenue for the year.

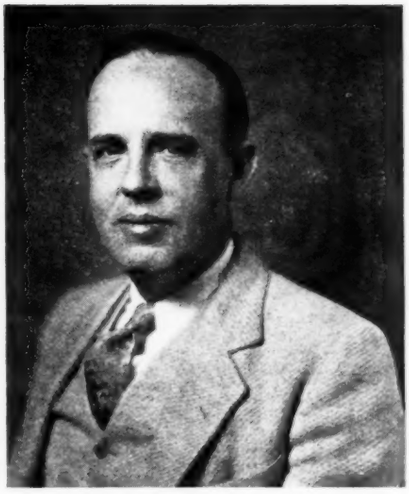
Venezuela's 1932 Production and Exports by Companies
(Figures in barrels)

	Production	Exports
Lago Petroleum Corporation	37,111,109	36,202,999
Venezuelan Oil Concessions Ltd.	33,496,127	33,581,114
Venezuela Gulf Oil Company	20,839,019	19,671,610
Caribbean Petroleum Company	13,576,252	9,770,971
Standard Oil Company of Venezuela	6,582,254	6,024,725
Colon Development Company Ltd.	5,878,971	5,893,846
British Controlled Oilfields Ltd.	1,595,384	1,630,006
North Venezuela Petroleum Company	365,148	342,951
Tocuyo Oilfields of Venezuela Ltd.	108,619	83,139
Orinoco Oil Company	55,111	.....
Central Area Oil Explor'n Co., Ltd.	21,511	.....
Total	119,596,512	113,201,361

Air view of Standard of Venezuela's Cumarebo field camp.

Science of Automatic Control in Refining

The Second of a Series of Articles on The Problems of Automatic Control by C. E. Mason in Which the Fundamentals of Control Engineering Applied to Refining Are Explained.



C. E. Mason

WITH THE constantly increasing emphasis on the vital importance of automatic control in the petroleum refinery, Mr. C. E. Mason, chief research engineer, The Foxboro Company, continues his explanation of the fundamentals of control engineering. In the first of this series of articles published in the June issue of WORLD PETROLEUM Mr. Mason covered briefly the history of the introduction of automatic control in refining, the types of control suitable for various processes, a comparison of the different functions of automatic and manual control and a definition of the various lags encountered. He continues in this article with an analysis of certain lags and the methods by which they are overcome. The remainder of the series will be completed in future issues.

IN PART I of this series we discussed the general principles of control from the standpoint of manual control as well as automatic, and attempted to show that in refining processes—which represent one of the most highly developed and complicated of the continuous industrial processes—all of the theories of fractionating and processing are based on the assumption of steady states of energy transmission or steady states of internal balance. As explained previously, this does not mean constant conditions, but proportionate changes in the supply which will maintain a desired balance between supply and demand. In commercial practice the problem becomes one of first establishing proportionate flows which will give these internal balances and thus allow the theories to be made practical.

It was proposed in Part I that the most practical and successful methods of obtaining these internal balances, either manually or automatically, were entirely dependent upon the physical characteristics of the process and the physical laws governing the reactions of either manual or automatic adjustments of the controlling medium.

We proposed to show that lags may be favorable as well as unfavorable and for this reason we included all types of lag under the general term of "process lag" and defined it as: "The influence of the physical characteristics of a process in slowing down or delaying the effect of any physical reaction upon that part of the process being controlled."

We proposed to analyze these characteristics by means of simple examples and for convenience we divided Process Lags in three distinct classes. The nature of their reactions suggests the names of Capacity Lag, Transfer Lag, and Velocity Distance Lag. These lags show distinct deferences in their effects and will be illustrated and analyzed separately in succeeding parts of the series.

Capacity Lag

CAPACITY Lag is by far the most important type of Process Lag, because its characteristics are involved in the basic fundamentals of all other types of lag. The second and third parts of the series will be devoted entirely to a study and analysis of Capacity Lag. This part will deal with Capacity Lag in connection with open and shut control or some modified form of open and shut and the third part will analyze Capacity Lag reactions to true throttling control.

"Capacity Lag is a process lag resulting from capacity in the process, so located that it only slows down but does not delay the effect of physical reactions upon that part of the process being controlled." The magnitude of its effect, *at any instant*, would be directly proportional to the ratio between the amount of stored-up capacity in that part of the process being controlled and the difference between the actual rate of supply and the actual rate of demand, at that instant. Thus it is evident that the magnitude of its influence is greater, the more nearly the supply is kept equal to the demand. If the supply is exactly equal to the demand the difference between supply and demand would be zero and ratio of the capacity to this difference would be infinite ($C/O=\infty$).

The following simple problem of pressure control clearly illustrates the first important characteristics of Capacity Lag. Fig. I represents a pressure control problem in which it is desirable to control 100 lbs. air pressure in a tank from which air is being withdrawn at a known rate.

We have shown a hand valve on the demand side for regulating the demand and a controlled valve on the supply side for regulating the supply. We realize that this would not be a difficult automatic control problem but we will assume certain valve reactions and determine what effect the capacity and the reactions have on the variations in pressure.

Most of the conclusions in these simple problems will be obvious, but they form the basis of the fundamentals of automatic control and are well worthy of serious consideration and study in order to avoid confusion and loss of interest in the more important analysis which will follow.

The more complicated and less obvious reactions of Capacity Lag will be given in Part III of the series and in order to avoid their entering into this problem it will be necessary to assume that the upstream pressure at the controlled valve is constant and sufficiently high that the small variations of pressure in the tank will not cause appreciable variations of flow into the tank.

An Illustration

WE WILL first assume a demand of one cubic foot per minute and consider the

capacity of the tank as being 1,000 cubic feet of free air at a pressure of 100 lbs. and consider the controlled valve as having a capacity 200 percent of the demand. Thus the controlled valve would pass 2 cu. ft. of free air per minute when fully open. Under these conditions the pressure would be increasing at the rate of 0.1 lb. per minute when the valve was fully open, and decreasing 0.1 lb. per minute when the valve is closed. If the controlled valve was opened for one minute it would be necessary to close it for one minute, in order that the average supply would equal the demand, and for repeated valve reactions of this nature, the variation would be 0.1 percent.

When the capacity is 100 cu. ft. the same demand, the same valve size and the same reactions would give a variation of one percent.

When the capacity is 10 cu. ft. the same demand, the same valve size and the same valve reactions would give a variation of 10 percent. Thus we note that—other conditions being constant—the variations in pressure are inversely proportional to the capacity of the tank.

If, in any of the above cases the first valve reaction had been to close the valve one minute, it would have been necessary to open it for one minute, in order that the average supply would equal the demand and the variations would have been the same.

Assuming the same demand, we will next consider the capacity of 1,000 cu. ft. and a controlled valve capable of passing 400 percent of the demand. Under these conditions, when the valve is fully open, the pressure would increase 0.3 lb. per minute and when the valve was closed the pressure would decrease 0.1 lb. per minute. Thus, if the controlled valve was opened for one minute it would be necessary to close it for three minutes, in order that the average supply might equal the demand, and for repeated valve reactions of this nature, the variation would be 0.3 percent.

When the capacity is 100 cu. ft. the same demand, the same valve size and the same valve reactions would give a variation of 3 percent.

When the capacity is 10 cu. ft. the same demand, the same valve size and the same valve reactions would give a variation of 30 percent.

If, in any of these cases, where the controlled valve is capable of passing 400 percent of the demand, the first valve reaction had been to close the valve it would have been necessary to open it for only ⅓ minute, in order that the average supply would be equal to the demand, and the variations would have been ⅓ as great in all cases.

Considering a demand of one cubic foot per minute, a valve capacity of 110 percent of the demand and a tank capacity of 10 cubic feet, a first reaction of opening the valve for one minute would require closing it for only 1/10 minute and the variations would be one percent, but if the first reaction was to close the valve for one minute, it would be necessary to open it for 10 minutes and the variation would be 10 percent.

In any of the above problems we could have caused the variation to be half as great by causing the first valve reaction to be one-half minute instead of one minute or we could have halved the variation by doubling the capacity of the tank.

An increase in demand would decrease the difference between the capacity of the valve and the actual demand. Thus, it would decrease the variation when the first reaction was to open the valve for the same time period. The difference between the supply and the demand, however, would be equal to the demand when the valve was closed and an increase in demand would increase the variation when the first reaction was to close the valve. A decrease in demand would, of course, produce opposite effects for corresponding valve reactions.

Relation of Variables

A CAREFUL consideration of a number of other conditions of valve sizes, demands and valve reactions as well as those above show a definite relationship between the variables which we have considered. These results indicate definitely that, for open and shut control, the variations are directly proportional to the maximum difference between the rate of supply and the actual rate of demand, times the duration of the valve reaction for that condition and that the variations are inversely proportional to the capacity. The actual percentage variation is expressed by: percent variation $= 100\ \frac{(S-D)t}{C}$ in which C is expressed as the volume of free air at the controlled pressure.

The time interval, in actual application of automatic control, is determined by the friction, lost motion or transfer lag in the control mechanism and the unfavorable lags in the process, but they could be materially compensated for by sufficient favorable Capacity Lags and favorable valve sizes.

It is within our power to govern the size of the controlled valve in automatic control and to locate the sensitive element of the controller in such a way as to avoid unnecessary process lags whenever possible. An analysis of the application, to determine roughly the Capacity Lag, will be of great value in determining the possible magnitude of unfavorable reaction, but we must not neglect the possibilities of friction or lost motion in the control mechanism or the very small transfer lag of the sensitive element. It is perfectly true that in well designed instruments these are usually negligible, but as the capacities become very small they become a rapidly increasing disadvantage.

Suppose, for example, in the above problem that the demand is one cubic foot and that when an automatic control opens the valve it is capable of recognizing the effect of the change and closing it in a second's time but that the valve passes 0.1 of a cubic foot during this time and that the capacity of the tank was one cubic foot of free air. This would mean that the valve would have to remain closed for five seconds. During the five seconds' time the pressure element would indicate the correct pressure and the variations would be a little more than eight lb. at 100 lb. or more than eight percent.

It is evident that variations may be reduced either by reducing the time periods of adjustments or reducing the excess of the adjustments. Also, it is evident that the excess adjustments may be greater if the time periods of adjustments are reduced, or the time periods may be lengthened if the excess of adjustments are reduced. Herein lies the contrasting difference between manual control and automatic control, when Capacity Lag is the outstanding process characteristic. A manual operator would, of course, attempt to make correct adjustments; that is, reduce the excesses to zero, and changing conditions would determine the amount of his necessary attention providing he did not overestimate his adjustments. A properly operating automatic, due to its mechanical advantage of constant attention, could make excessive adjustments, for they would be of extremely short time duration, provided there was no friction or lost motion in the mechanism and there was sufficient power and sensitivity in the actuating element. Changing demands would be taken care of perfectly for they would only require proportionate variations in time periods.

Manual and Automatic Control

THE MANUAL operator would have to allow greater variation for he must observe the rate of deviation before being able to estimate correctly the magnitude of his adjustments, for if he attempts to make excessive adjustments in order to restore pressures quickly or hold them more closely, he is more likely to overrun and cause even greater variations, *unless* he gives correspondingly closer attention.

The first automatics were developed for such applications or applications having predominance of Capacity Lags of other

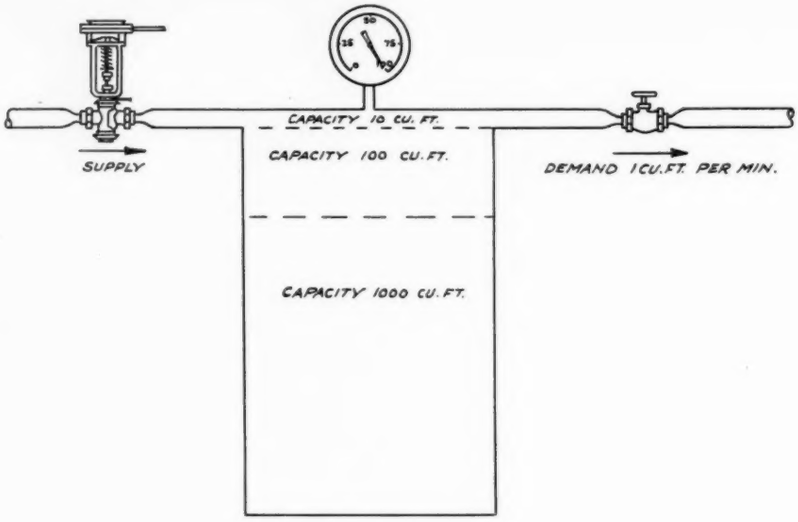


FIG. I.

Diagram of a simple pressure control problem.

forms. They were, of course, successful as far as controlling independent processes were concerned. They were capable of taking care of serious changes in demand. They produced surging flow—even the improved designs—but this was often no disadvantage unless they affected other processes.

In later analyses we shall see that, in the presence of unfavorable lags, the surges produced by such automatics are of greater time duration and thus become very serious and objectionable, and we shall see that the mechanical reproduction of steady flows, even in the presence of favorable lags, requires very unusual consideration of physical laws and mechanical design.

In temperature control problems we would probably encounter more possibilities of unfavorable lags (transfer lags) but if these unfavorable lags cause greater time intervals between controlled valve reactions, correspondingly larger amounts of Capacity Lags, or more favorable valve sizes or restricted flow reactions, would be capable of counteracting their effects materially, in quite the same way that they reduced the magnitude of variations in the pressure control problem given above.

It is also evident from our simple pressure control problem that if conditions of the process, the design or mechanical operation of the instrument permit very short periods of time between controlled valve reactions, a comparatively small amount of Capacity Lag would be sufficient to give close control.

An interesting example of relative amounts of Capacity Lag is furnished by comparison of an electric light bulb and an electric iron. In the case of the light bulb the amount of heat stored up in the filament is very small compared to the amount of heat necessary to maintain it at a white heat. Thus, when the current is shut off the filament almost instantly loses its glow. It would be impossible to operate a hand switch sufficiently fast to maintain a steady glow of any lesser intensity. The ordinary alternating current is producing this same effect sixty times a second, however, and we are unable to distinguish any variation in intensity. When tungsten filaments of very small heat capacity are used with 25 cycle current we are actually able to distinguish variations in the intensity of light. Neon bulbs which have no heat capacity give a flickering sensation with even 60 cycle current.

In the case of the electric iron—with its large heat capacity—it is quite an easy matter to maintain its surface at a very constant temperature by turning the current off and on at comparatively long-time intervals.

The physical characteristic of no heat capacity in Neon bulbs permit them to go completely off and on with the current cycle and by having no other light available the effect allows some very interesting slow motion analyses of periodic motions by adjusting the current cycle so as to be slightly out of phase with the periodic motion. By this means, the valve mechanisms of high speed motors may be made to appear to be standing still or running at any desired slow speed or the nature of the vibrations of high speed turbines and generators may be observed by the same method.

At the Century of Progress Exhibition in Chicago some very interesting and weird effects of this principle are demonstrated by the Massachusetts Institute of Technology in booths six and seven in the Hall of Science. The equipment used in these experiments is known as the Edgerton Stroboscope, but the principle is the same and the effects are possible because of zero heat capacity in the mercury Vapor Light.

By-Pass Control

IN THE PRESSURE problems above we have considered positive "on" and "off" control or conditions which made it necessary for the process to receive either a zero rate of flow or a rate that is often several hundred percent greater than the actual demand. If there is not sufficient predominance of capacity to allow such extreme variations in flow, it is very likely that the resulting overruns and underruns could be greatly reduced by reducing the magnitude of the maximum and minimum flows.

Probably the first attempts to eliminate the cause of overcontrolling or hunting with automatic controls was to pass as large a portion as possible through the by-pass around the controlled valve. This would, of course, tend to make the minimum flow more nearly equal to the actual demand but the maximum flow would be even greater, if the capacity of the line would permit, for it would equal the capacity of the valve plus the flow through the by-pass. If the maximum flow, however, is also limited to a desirable amount by pinching a hand valve ahead of the controlled valve, the percentage increase and decrease flow can be adjusted to any desirable amount. These adjustments are, in reality, increasing the effective capacity by reducing the possible difference between the actual supply and the actual demand.

The variations will be a minimum only when the actual demand is the average of the maximum and minimum flow; for the excess in either direction is equal to one-half the difference. If the demand is increased, the closed position of the valve would represent a greater excess. If the demand is reduced, however, the open position of the valve would represent a greater excess. Our manual operations of the controlled valve in the original problem proved that the variations were directly proportional to the greatest excess adjustment, unless the time elements were proportionately adjusted but in actual applications of automatics these time elements are determined by the various types of lags involved.

These adjustments will also limit the rangeability of the automatic control for it will be unable to increase the flow above the maximum adjusted flow or decrease it below the minimum adjusted flow. When maximum and minimum demands are within a very narrow range or favorable capacities of the process permit rather wide fluctuations in maximum and minimum flows, such adjustments may be made to give close control; but if the conditions or the demand change, the hand valves in the by-pass and ahead of the controlled valve must again be adjusted to obtain best results. The flows are always surging and applications of this method are, of course, limited to possibilities of cycling control reactions.

The reactions of this method are identical to those obtained with "two step control" as accomplished with many types of electrical instruments. A properly designed electrical instrument has the advantage of adding other mechanisms to produce more desirable control reactions and has a very sensitive point of "off" and "on" reaction. Any other type of instrument used for this type of reaction should be adjusted for the most sensitive type of "off" and "on" control. Any throttling reactions would become a hindrance to the method for they may produce a slowly "off" and slowly "on" reaction and thus increase the time periods of the excess adjustments.

Harmonics in Automatic Control

WHEN continuity of processing, such as refining, requires several individual processes to operate in close association with each other, their control cannot usually be accomplished by surging flows, because of their interference with each other. Even in the absence of unfavorable lags and the presence of Capacity Lag, surging flows must either be of small magnitude or made exceedingly fast to prevent another and mysterious type of cycle due to harmonics.

If the magnitude of cycles cannot be made sufficiently small to reduce the effect of harmonics, better results might be obtained by reducing the time duration of the cycles and allowing the magnitudes of cycles to become greater if necessary. In some cases a quickly "on" and "off" reaction will reduce the duration of the cycle and result in smaller variations. For the same reasons partial adjustments to obtain throttling control may actually produce greater variations than open and shut. In other cases the reverse is true. When the best type of adjustment is once determined, changing conditions may switch the problem to the other type. All of these complications are a result of cycling reactions and the complicating characteristics of harmonics. General rules which might be practical would be even more complicated and far more impractical than to "cut and try."

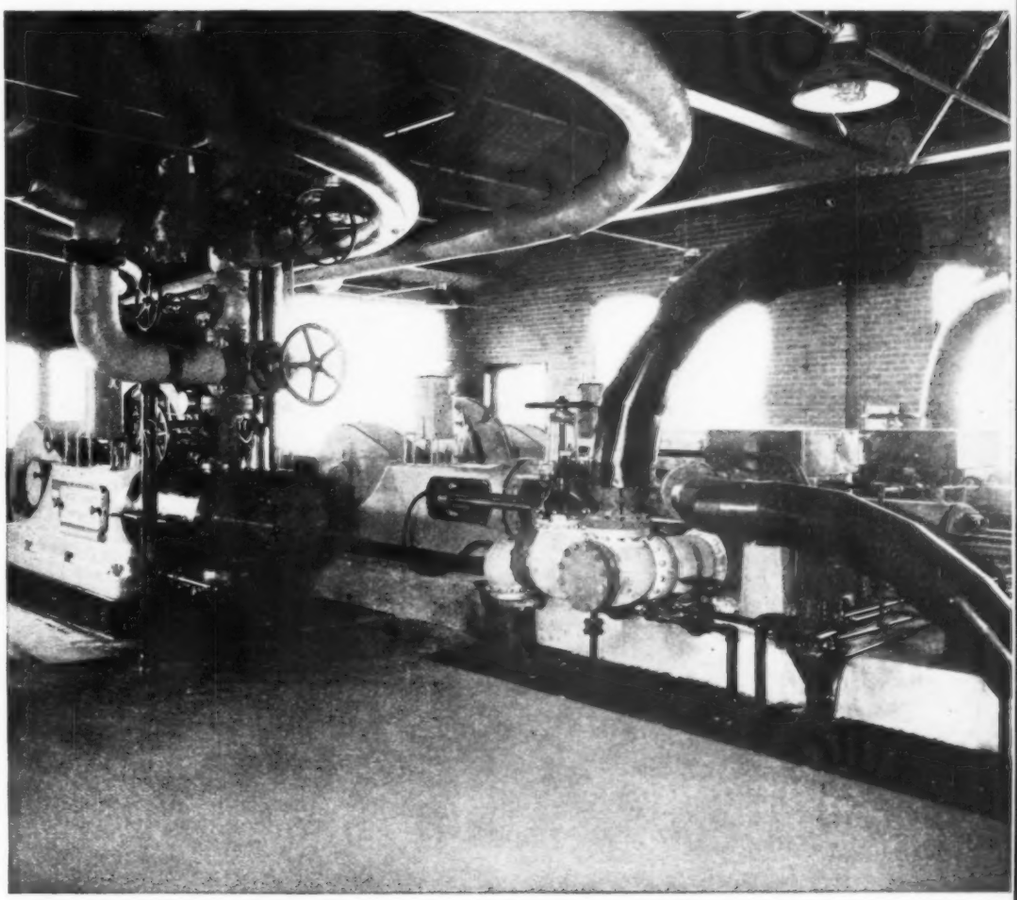
Harmonics may also be produced in individual process installations by friction and lost motion in the actuating element or control mechanisms, causing harmonics between the instrument and the process. This is the most common difficulty experienced with conventional designs operating on processes which should be easily controlled. They may control perfectly at times and cycle radically at others. If the conditions are such that friction and lost motion can absorb one cycle, the harmonics are completely eliminated; but a change in conditions may start them again. Analyses of such conditions are very interesting but complicated and of very little commercial value because of the complicated theories involved. We may analyze one in a later series to illustrate the complications or cycling control when unfavorable lags are involved.

The theory of harmonics in automatic control is identical with the theory of harmonics in sound or any other cycling phenomena, and we just realize that when dealing with cycling reactions to produce automatic control, we are introducing possibilities of complications which would require the most scientific study to understand their actual reactions. We will not go into the theory of harmonics because cycling control, which produced them, has no commercial value in continuous process control such as refining.

The absences of unfavorable lags or the predominance of Capacity Lag are the only conditions favorable to cycling control, but such conditions are also favorable to true throttling control and such processes can be controlled by steady flows without the possibilities of harmonics or interference with other processes. The mechanical advantage of constant attention by an automatic may still be used but the mechanical reactions of the automatic must be similar to the reactions of a manual operation.

In order to illustrate clearly the physical laws involved in true control balance we will in the next article of this series analyze a simple temperature control problem from the standpoint of obtaining perfect temperature balance by manual control. This problem will again illustrate a predominance of Capacity Lag, but the methods of obtaining control balance are practical and by far more interesting.

Wilson Snyder hot oil pumps at Shell of Canada's Dubbs plant, Montreal East.



World Oil Production—Official Figures for 1933

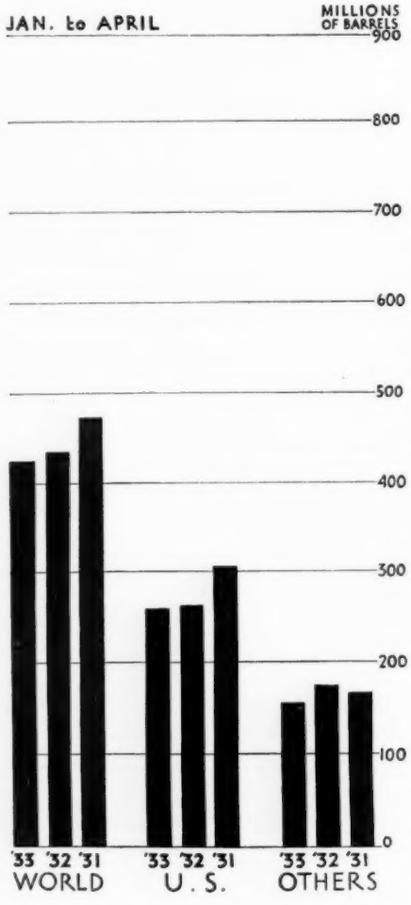
All figures furnished direct to WORLD PETROLEUM by Governments, except where otherwise specified

(Figures in U. S. Barrels—Conversion ratio 7 bbl. = 1 ton)

Country	January 1933	February 1933	March 1933	April 1933	May 1933
United States	63,998,000	61,029,000	75,302,000	63,313,000	83,112,000[4]
Russia	10,382,400	10,162,600	11,003,300	11,824,400	12,794,600
Venezuela	8,750,000	9,985,711	10,324,328	9,340,870	9,380,893
Roumania	3,999,898	3,661,749	4,009,649	3,500,000[1]	3,500,000
Persia[2]	3,563,112	2,929,668	3,683,386	3,984,519	4,370,835[4]
Mexico	2,889,658	2,543,443	2,825,021	3,007,796	2,873,486
Netherland India	3,096,051	3,031,021	3,390,051	3,028,639	3,357,214
Colombia	1,005,353	1,035,273	1,218,626	1,093,410	1,169,238
Argentina	1,138,500	1,153,500	1,140,000	1,051,000	1,210,300
Peru	976,931	806,785	825,000	818,359	820,000[1]
Trinidad	815,439	778,842	839,857	834,876	816,080
British India	732,894	669,617	124,103	700,000[1]	700,000[1]
Poland	338,100	299,845	300,000[1]	318,619	326,900
Sarawak	180,320	194,166	214,984	198,800[1]	130,200[1]
Japan and Taiwan[1]	195,000	195,000	195,000	195,000	195,000
Egypt	136,451	126,861	131,964	124,103	136,500[1]
Ecuador	133,912	119,345	128,504	121,647	128,226
Canada	82,778	73,087	87,218	84,974	89,754
Germany	130,732[3]	121,835[3]	141,183[3]	129,591[3]	130,000[3]
Iraq[1]	100,000	100,000	100,000	100,000	100,000
France[1]	46,000	46,000	46,000	46,000	46,000
Others[1]	36,000	36,000	36,000	36,000	36,000
Total	102,727,529	99,098,348	116,703,373	104,031,603	125,423,226

[1] Estimate. [2] Anglo-Persian Oil Co. figures revised; fuel oil returned to the ground has been deducted. [3] Thuringea estimated: official figure for Prussia. Sakhalin Russian included with Russia. Sakhalin Japanese included with Japan. [4] A.P.I. estimate.

Comparison of crude oil production in the United States, all other countries and total for the world during the first four months of 1933 and corresponding periods of 1932 and 1931.



Official Figures for 1931, 1932 and First Five Months of 1933

Country	Total 1931	Daily Average 1931	Total 1932	Daily Average 1932	Total 5 months 1933	Daily Average 5 months 1933
United States	851,081,000	2,331,729	781,845,000	2,136,188	346,666,000	2,295,800
Russia	156,342,900	428,336	149,719,000	409,070	56,203,300	372,207
Venezuela	120,343,104	329,707	119,596,512	326,766	47,781,802	316,435
Roumania	46,333,945	126,942	50,491,205	137,954	18,671,296	123,650
Persia[2]	40,253,486	110,283	45,122,455	123,285	18,558,456	122,903
Mexico	33,038,853	90,517	32,802,285	89,624	14,139,367	93,638
Netherland India	32,818,346	89,913	39,584,027	108,153	16,082,976	106,509
Colombia	18,237,190	49,965	16,384,956	44,768	5,521,900	36,569
Argentina	11,709,759	32,081	13,166,900	35,975	5,693,300	37,704
Peru	10,102,116	27,677	9,899,266	26,026	4,247,075	28,126
Trinidad	9,743,763	26,695	10,023,780	27,387	4,085,094	27,053
British India	7,830,101	21,452	8,600,312	23,500	3,563,813	23,601
Poland	4,397,760	12,048	3,905,230	10,670	1,583,464	10,486
Sarawak	3,338,472	9,146	2,274,043	6,213	918,470	6,082
Japan and Taiwan[1]	1,884,285	5,135	2,340,000	6,393	975,000	6,500
Egypt	1,845,938	5,057	1,742,370	4,760	675,976	4,476
Ecuador	1,750,633	4,796	1,573,857	4,300	631,634	4,183
Canada	1,583,339	4,337	1,054,373	2,880	417,811	2,767
Germany	1,778,602	4,873	1,824,019	4,983	653,341	4,327
Iraq[1]	1,200,000	3,300	1,200,000	3,300	500,000	3,333
France[1]	512,862	1,405	552,000	1,508	230,000	1,533
Others[1]	338,700	930	432,000	1,180	180,000	1,200
Total	1,256,465,154	3,442,370	1,294,134,090	3,535,885	547,980,075	3,629,007

UNITED STATES

	Daily Production bbl.	Daily Runs to Stills bbl.	Gasoline Stocks bbl.	Imports for week bbl.	California Shipm. East for week bbl.
Week Ending May 27	2,810,150	2,410,000	58,770,000	931,000	661,000
	990,100*				
Week Ending June 3	2,780,600	2,310,000	58,090,000	707,000	183,000
	943,000*				
Week Ending June 10	2,797,550	2,253,000	54,647,000	591,000	314,000
	925,000*				
Week Ending June 17	2,728,850	2,495,000	55,400,000	544,000	317,000
	907,000*				

Underlined figures indicate improvement in statistical position—decrease in production, runs to stills, gasoline stocks or imports.

* Total estimated production, official and unreported, of the Rusk-Gregg field, East Texas.

Exports Highest Since Tariff

DURING April, 1933, the tenth month after imposition of a tariff on crude oil and its products, total imports declined noticeably under the figures for the preceding month, amounting to 4,264,000 bbl., as compared with 5,309,000 bbl. imported in March, 1933, and a monthly average of 9,090,000 bbl. imported during the first six duty-free months of 1932. A nominal volume of 1,000 bbl. of motor fuel was imported during the whole of April, 1933, as compared with a monthly average of 1,272,000 bbl. imported during the first six duty-free months of 1932.

Exports of all petroleum products, and of motor fuel as well, increased sharply in April, 1933, reaching the highest volume since the imposition of the tariff in United States ten months ago. Total exports in April, 1933, amounted to 9,671,000 bbl., as compared with 7,555,000 bbl. exported during the preceding month, an increase of 21.85 percent, but 9.10 percent under the total exports in April of 1932. Motor fuel exports increased to 3,256,000 bbl. in April, 1933, as compared with 2,363,000 bbl. exported in March, an increase of 27.42 percent, but 14.54 percent under motor fuel exports in the corresponding month of 1932.

The post-tariff trade readjustment, favorable to domestic producers, reached in April, 1933, the most advantageous trade balance for the United States since October of 1930. Reduction in motor fuel imports of 1,271,000 bbl. greatly exceeded the reduction in motor fuel exports, which declined but 284,000 bbl., while the imports of all other petroleum products contracted by 3,555,000 bbl. during April, 1933, and their exports declined by only 353,000 bbl., leaving a favorable post-tariff balance of 4,895,000 bbl., or 163,000 bbl. per day, which was taken out of domestic products and not from imports, which would have been the case if the oil tariff had not been in force. The above figures are arrived at by comparing the monthly average for the first six duty-free months of 1932 with the export-import data for the latest month on record.

Motor Fuel Supply-Demand

INDICATED domestic demand for motor fuel during April, 1933, averaged 1,006,000 bbl. per day, an increase of 10.43 percent over the daily average for the preceding month; 47,600 bbl. per day under the domestic motor fuel consumption in April of 1932, a decline of 4.53 percent; and 132,000 bbl. per day under the domestic motor fuel consumption in April of 1931, the peak year, a decline of 11.60 percent. The continued and apparently firmly founded acceleration in industrial activity in the United States, as indicated by the New York Times weekly index of business, which reached the best level since November, 1930, promises that the domestic motor fuel demand during the balance of the current year will exceed the demand for the corresponding period of 1932. It is considered that the Century of Progress Exposition in Chicago, being held at the height of the motoring and vacation season, will be a contributory factor to increased motor fuel demand.

The daily rate of exports of motor fuel averaged 109,000 bbl. in April, 1933, an increase of 43.45 percent over the preceding month; a decrease of 14.18 percent under April of 1932; and of 21.19 percent under April of 1931.

Total daily demand for motor fuel in April, 1933, therefore decreased by 5.50 percent as compared with the same month of 1932, and by 12.76 percent as compared with April of 1931, the year in which the motor fuel demand was at peak.

On May 1, 1933, motor fuel stocks at refineries, terminals and in transit amounted to 59,694,000 bbl., a decrease of 862,000 bbl. as compared with stocks on hand on April 1, 1933, indicating that during April motor fuel demand exceeded supply by 28,700 bbl. per day. On May 1, 1932, total motor fuel stocks amounted to 68,811,000 bbl., indicating that in the past year comparable storage has been reduced by 9,117,000 bbl., statistically a most favorable factor, but entirely overshadowed by dumping of cheap crude oil and gasoline from the East Texas field.

Price Advance Gains Momentum

THE REDUCTION of the East Texas allowable production from 825,000 bbl. per day to about 550,000 bbl. on June 13 was the signal for the crude oil price advance to the levels existing before April 24, when the Texas Railroad Commission permitted the larger production. Refinery gasoline quotations began advancing in a runaway market somewhat earlier in anticipation of the crude oil price increase, while motor fuel service station/tank wagon prices were similarly advanced in certain localities.

Effective June 2 the Standard Oil Company of New Jersey advanced its service station/tank wagon prices of gasoline from 1 cent to 3½ cents a gallon, stating that "prices in New Jersey and certain other areas have been abnormally depressed, and that the present move will return prices to normal levels; the adjustment will vary at different points, depending on local conditions." On the same date the Standard Oil Company of New Jersey and the Socony-Vacuum Corporation advanced gasoline tank car prices ¼ of a cent a gallon at Bayonne, N. J., and in Baltimore and Philadelphia. Beginning June 15 tank wagon/service station prices advanced throughout the United States including the Pacific Coast from 1½ to 2 cents per gallon, present quotations being 16¼–18–20½ cents, Lake states; 15–16–18½ mid-Continent; 14–17½–20 Pacific Coast; respectively for the three grades including all taxes.

In the central states the Standard Oil Company (Indiana) announced on June 6 a number of steps designed to prevent local price "wars" and to stabilize the distribution of motor fuel. The company narrowed the margin between tank car and tank wagon quotations in order to prevent marketers from sharing their margins with the consumer, a factor which has been responsible for endless price cutting; the company's dealers and AAA operators were ordered to absorb one-half of any service station local price reduction, thus making their profits directly subject to the stability of local markets and active avoidance of undercutting; the company also stated that "under no circumstances will it loan or lease gasoline or kerosene equipment to new outlets of any kind, nor will it loan or lease air compressors, air towers, etc., to dealers, operators or consumers," while if "equipment now on loan or lease becomes damaged, destroyed or worn out, it will not be replaced."

Refinery gasoline quotations in the latter half of June were sharply up from the preceding month: 3¾–4 cents per gallon for 58–60 U.S.M., 57 and below octane rating in Group 3, Oklahoma market; 57 to 64 octane rating, U.S.M., was quoted at 4¼–4½ cents per gallon; and 65 and above octane rating, U.S.M., commanded 4½–4¾ cents per gallon.

Crude Oil Prices

		Dec. 1932	Jan. 17, 1933	May 2–9, 1933	June 17, 1933	
Okla., N. Texas and Kansas	28 deg.	$0.53	$0.28		$0.28	
	36 deg.	0.69	0.44	$0.25 flat	0.44	
	40 deg. top	0.77	0.52		0.52	
East Texas	flat	0.75	0.50	0.25*	0.50	
West Texas	flat	0.50	0.30	0.20	0.30	
Darst Creek	flat	0.60	0.35	0.23	0.35	
						June 22, 1933
Gray Co., Texas	40 deg.	0.88	0.40	0.20 flat	0.40	0.46
Gulf Coast						
incl. Conroe	25 deg.	0.70	0.44		0.44	
	30 deg.	0.80	0.54	0.30 flat	0.54	
	34 deg. top	0.88	0.62		0.64	
Smackover, Ark.	flat	0.50	0.40	0.20	0.30	
Rocky Mountains						
Salt Creek	36 deg.	0.69	0.44	0.25		
Elk Basin	flat	0.87	0.62	0.62		
				May 22, 1933		June 26, 1933
Pennsylvania						
Bradford Distr.	flat	1.72	1.47	1.27 1.37	1.47	1.57
Eureka Lines	flat	1.37	1.12	0.92 1.02	1.12	1.22
Lima	flat	0.90	0.70	0.55	0.75	
Illinois	flat	0.87	0.62	0.47	0.67	
Mt. Pleasant, Mich.	flat	0.85	0.95	0.75	0.75	

*(10¢ Apr. 24–May 4.)

On the east coast, at Bayonne, the U.S.M. grade, 57 to 64 octane rating, was quoted at 5¼–5½ cents per gallon, 1–1¼ cents above the quotations of the preceding month. Gulf Coast prices for export on June 17 were 4½ cents per gallon for 58–60 U.S.M. grade, 1¼ cents above May quotations. In the East Texas field the third grade gasoline firmed appreciably and was quoted on June 17 with but little discount as compared with Group 3 prices.

Natural gasoline prices moved up with refinery gasoline, and were quoted at 2¾–3 cents per gallon for grade 26–70 in Oklahoma and in North Texas, and at 3¼ cents per gallon in North Louisiana.

Kerosene prices, after improving in April and early in May, remained steady during June. In the second half of June grade 41–43 w.w. was quoted at 2½–2¾ cents per gallon in Group 3, Oklahoma market, and at 5–5¼ cents per gallon on the East Coast, at Bayonne. Gulf Coast prices for export remained unchanged at 3¼–3⅞ cents per gallon for 41–43 p.w. grade.

Posted crude oil prices throughout the mid-continent and eastern fields in the United States were advanced on June 17, subsequent to the reduction of the East Texas allowable production to 550,000 bbl. per day. In the mid-continent fields crude oil prices were returned to the level existing prior to the cut of April 24, while in eastern fields minor advances were made, as indicated in the accompanying table.

Prior to the advance of crude oil prices on June 17 premiums, up to 25 cents per barrel, were being offered to the producers withholding crude oil from the markets; but even with premiums only small amounts could be purchased, indicating that with the currently increased prices but little more crude will be moving to the refineries in Oklahoma and in Kansas. The refiners, therefore, will apparently have to choose between shutting down their plants, or again offering premiums, which will bring the unofficial crude oil prices to around 75 cents per barrel during late June, and will probably force a further increase in posted prices to around 75 cents per barrel, or higher, by July 15. Crude prices are already tending toward 75 cents but are awaiting actual enforcement of proration in East Texas. That such development has been anticipated is indicated by the refinery gasoline quotations, which, as already mentioned, are rapidly approaching 4 cents per gallon for low octane U.S.M. grade in Group 3, Oklahoma market.

Developments in Texas have been favorable for increased crude prices: field pressure and well potentials are declining steadily in the East Texas field; surprisingly moderate field potential in Conroe was shown on the recent 24-hour tests of key wells; and the final proving for commercial production of the Tomball indicates that the area will be conservatively developed.

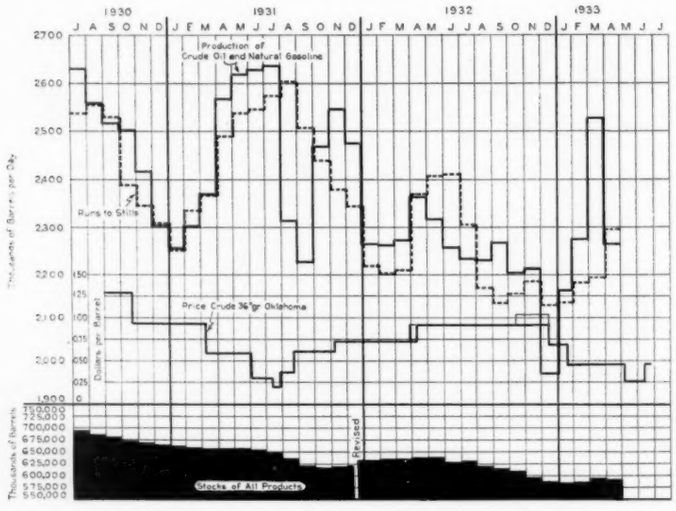
The increasing domestic motor fuel demand as a result of the marked improvement in industrial activity of the country, as well as the forthcoming Federal restrictions of unfair practices of illegal production and of local underselling of motor fuel should be responsible for considerably better quotations during this summer, with crude oil probably rising to $1.00 per barrel and third grade refinery gasoline to 5 cents a gallon.

National Industrial Recovery Act

THE NATIONAL INDUSTRIAL RECOVERY ACT was finally approved and passed by both branches of the Congress on June 13, and was signed by President Roosevelt on June 16. Several submitted amendments dealing specifically with the oil industry, more particularly with the proposed dictatorship, were rejected by the Senate, when President Roosevelt decided not to press their adoption.

As enacted the National Industrial Recovery Act provides for oil industry in its Section 3 covering the Codes of Fair Competition, and in its Section 9, which proposes to regulate pipelines and also authorizes the President to prohibit interstate and foreign commerce in

U. S. production, runs to stills and price of crude oil in relation to stocks of all petroleum products.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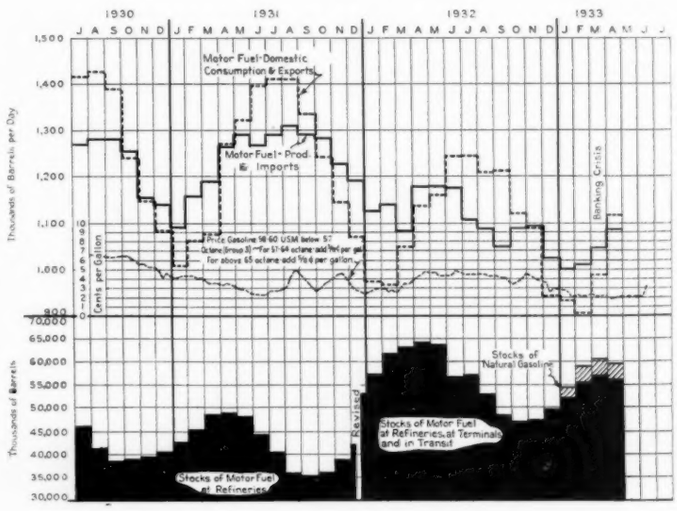
Production of Crude Oil and Natural Gasoline
Runs to Stills
Price Crude 36° gr. Oklahoma
Dollars per Barrel
Revised
Stocks of All Products

U. S. consumption and exports, production, imports and prices of motor fuel in relation to motor fuel stocks.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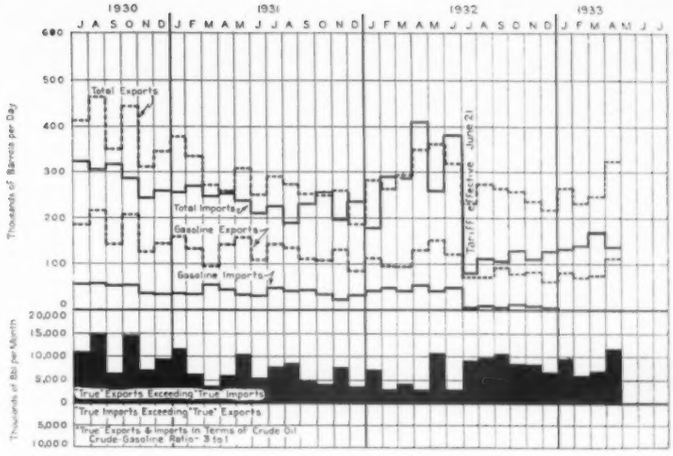
Motor Fuel-Domestic Consumption & Exports
Motor Fuel-Prod. & Imports
Price Gasoline 58-60 USM below 57 Octane (Group 3) —For 57-64 octane add ¼¢ per gal. For above 65 octane add ½¢ per gallon
Cents per Gallon
Banking Crisis
Stocks of Natural Gasoline
Stocks of Motor Fuel at Refineries, at Terminals and in Transit
Revised
Stocks of Motor Fuel at Refineries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Thousands of Barrels per Day
Total Exports
Total Imports
Gasoline Exports
Gasoline Imports
Tariff effective June 21
Thousands of Bbls per Month
"True" Exports Exceeding "True" Imports
True Imports Exceeding "True" Exports
"True" Exports & Imports in Terms of Crude Oil
Crude-Gasoline Ratio- 3 to 1

Total U. S. imports and exports and gasoline imports and exports in relation to true exports exceeding true imports.

illegally produced crude oil and its products.

The Recovery Act also elevates the trade associations from an academically passive role to an actively practical part in the Federal administrative mechanism, thus creating what may be termed "cooperative group management by vote of majority within an industry," subject only to the approval of its fairness to minorities by the Federal Administrator. Interest and sinking fund requirements for the $3,300,000,000 public works bonds authorized under the Act will be in part covered by an additional Federal tax on gasoline equal to ½ a cent per gallon, expected to yield to the Treasury $62,000,000. General Hugh Johnson has been appointed by the President as Chairman of the Industrial Recovery Board, while it has been unofficially reported that Walter C. Teagle, President of the Standard Oil Company (New Jersey) will be one of the members of the board. The codes adopted and their relation to the National Recovery Act are discussed elsewhere in this issue.

Proration Strengthened

ON MAY 26 an interlocutory injunction against the recent 750,000-bbl. East Texas oil proration order of the Texas Railroad Commission was denied by a three-judge federal court sitting in Fort Worth, the first instance of a Federal Court upholding an East Texas proration order of the Railroad Commission. The lawyers for one group of companies claimed that under the new order the allocation of allowable production was unfair, that the method of taking potentials was not accurate, that acreage was not taken into consideration and that the allowable of the field was too high.

The second group of complainants, represented by F. W. Fisher of Tyler, claimed that the daily allowable was too low, being but 0.6245 percent of the daily capacity of the wells as determined by potential tests.

Order Sustained in Courts

IN DENYING the interlocutory injunction Judge Hutcheson stated:—"At present we are not convinced that failure to include acreage invalidates the order. We do not say that the commission is compelled to or ought to include acreage. We are all impressed with the view that the problem of determining what shall be done in the field has been emphasized by the situation in which we find ourselves in this case—one set saying the figure is too much, another that it is too low; one set saying acreage should be considered, another that it should not." The plaintiff companies decided to postpone further action until the Texas Railroad Commission's proration hearing which was held June 12.

Subsequently to this decision of the federal court, Federal Judge R. Bryant at Texarkana on June 1 granted the Railroad Commission a temporary injunction restraining Saco Oil Corporation and others from violating the proration order and a special three-judge state court at Austin on June 9 refused to grant T. D. Humphrey an injunction to restrain the Railroad Commission from enforcing its orders, the injunction having been sought on the grounds that oil was being drained from under the plaintiff's leases by owners of offset wells. On June 17 the Sixth Court of Civil Appeals at Texarkana conceded the right of the State of Texas to appoint receivers to take charge of properties of oil companies violating proration and gauging laws, and affirmed four receiverships submitted from Rusk and Gregg counties.

Other injunctions and receiverships were granted to the state attorney general's department during June against violators of the Railroad Commission's orders, this being the first month in which the Texas Railroad Commission succeeded in winning all its major complaints against illegal operators.

The Railroad Commission was greatly assisted in more rigid enforcement by two newly enacted state emergency statutes, one of which permits the Commission's enforcement officials to carry weapons, serve warrants, gauge tanks, inspect wells and make arrests for violations of conservation statutes; and the other which makes violations of the conservation orders punishable as misdemeanors for the first offense, with fines from $500 to $5,000 and/or jail sentences from 30 days to one year, and as felonies for the second offense, with sentences from two to four years in state penitentiaries.

The Texas Senate State Affairs Committee on May 31 killed the House Bill which proposed to levy a tax of 50 cents a barrel on oil produced in violation of proration regulations.

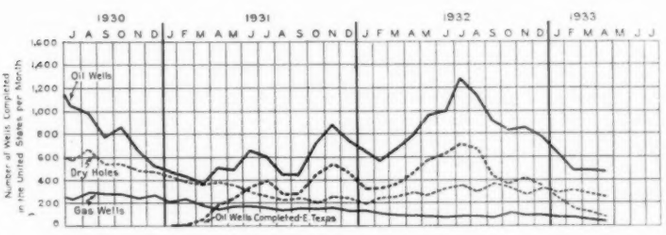
The Texas Railroad Commission held a hearing on the East Texas field on June 12 and, following exhaustive testimony on declining reservoir pressures and well potentials, ordered the production of the field to be reduced 33.33 percent, to 10 percent of the hourly potentials, the new order reducing the allowable of the whole field to around 550,000 bbl. per day, as compared with 826,800 bbl. per day permitted under the old order. The new order provides that "no well should produce less than 20 bbl. per day of the limit fixed by statute for marginal wells." The acreage factor was included in the new order indirectly by permitting, upon application to the commission, "the drilling of any well or wells in the East Texas field in order to prevent waste, to protect vested rights and to protect any owner, operator or manager, or any well in the East Texas field against drainage by the well or wells of other owner, operator or manager, or to eliminate any inequity now existing or which may hereafter exist as between any well and wells."

The Texas Railroad Commission on testimony presented at a recent hearing ordered that "production from all sands" in the Conroe field "shall be governed by the same regulations and restrictions." The decision terminated unrestricted production of a number of wells producing, or claimed to produce, from the Upper Cockfield sand on the South flank of the Conroe field, and therefore supposedly forming a separate reservoir from the main Conroe sand, and accordingly not subject to proration as applied to the main Conroe field. The new order reduced the production of the Conroe field from about 85,000 bbl. per day to 65,000 bbl.

Oklahoma and Kansas

THE SHUTDOWN movement started by Oklahoma and Kansas oil producers in retaliation of the 25-cent crude oil resulted in withdrawal of considerable volume of crude oil

U. S. drilling: comparison of oil wells, dry holes, and gas wells.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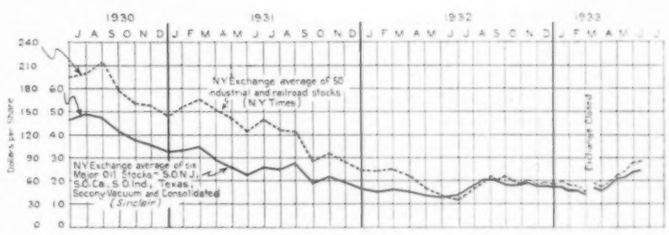
Number of Wells Completed in the United States per Month
Oil Wells
Dry Holes
Gas Wells
Oil Wells Completed-E. Texas

Six major oil stocks in relation to 50 industrial stocks on the New York Stock Exchange.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Dollars per Share
N.Y. Exchange average of 50 industrial and railroad stocks (N.Y. Times)
N.Y. Exchange average of six Major Oil Stocks- S.O.N.J., S.O.Ca., S.O.Ind., Texas, Socony-Vacuum and Consolidated (Sinclair)
Full scale ruled

from the markets, sufficient in quantity to force the closing of several refineries in the two states. In addition to shutting down producing wells, a large volume of crude oil from wells which could not be shut in was stored by producers in expectation of higher prices. In fact the Oklahoma City field operators with an allowable production during May of 159,410 bbl. per day, actually did not sell from that field over 60,000 bbl. daily, while the Central and Western Kansas operators with May allowance of 61,300 bbl. per day, produced but 45,300 bbl. per day, part of which production was also stored and temporarily withdrawn from the markets.

The voluntary producers' strike at the time of increasing summer demand caused great inconvenience to several major pipeline companies supplying their own refineries or other customers on contracts. Vice President J. A. Veasey of the Carter Oil Company (S.O.N.J.) presented a petition to the Oklahoma Corporation Commission asking for increased allowance, totalling 45,000 bbl. per day, and indirectly suggesting that if his company was not able to purchase this amount daily, it would be forced to withdraw from Oklahoma as a purchaser.

Shell Petroleum Corporation similarly requested the Corporation Commission for increased allowables in Lucien and Roxana fields, asking for 12,000 bbl. per day in the Lucien pool and for 3,000 bbl. per day in the Roxana pool. The Corporation Commission set the petitions of the Carter Oil Company and the Shell Petroleum Corporation to be heard June 27, past the limit set by the Carter Oil Company. The Corporation Commission on June 21 allowed the Wilcox sand none, Oklahoma City field an additional 43,791 bbl. daily retroactive to June 1, Seminole received an additional 30,300 bbl. daily allowable, not retroactive and Tatums an additional 3,000 bbl.

Champlin Refining Company, Sterling Refining Company and Refiners Producing Company, also unable to secure crude oil at current prices, filed a suit in the State Supreme Court attacking the constitutionality of the new state proration law, branding it as "a price fixing setup with the mask now taken off." The appellants also assailed the shutdown agreement among 35 operators with 224 wells in Oklahoma City field as "a combination in restraint of trade and a violation of the Sherman anti-trust law." Previous to that action the state supreme court refused to the Sterling Refining Company and Refiners Producing Company a temporary or "emergency" injunction against the Corporation Commission, the two companies asking for 5,000 bbl. per day allowable from their two Oklahoma City wells, which are currently permitted to produce 400 bbl. per day.

Conroe—Texas Gulf

THE TEXAS RAILROAD COMMISSION ordered potential tests to be run on 54 key wells in the Conroe field, the 24-hour tests to be made through ¼-inch chokes, at least 6 inches long. Results of the first 50 wells tested indicated an average potential of only 482 bbl. per well per day, or a total field potential of less than 216,000 bbl. per day. The potential figures obtained from production tests have been somewhat disappointing because a number of wells in the Conroe field tested from 1,000 to 2,000 bbl. per day initially through small chokes, indicating a drop in flowing capacities.

Effective June 1 the allowable production per 20-acre unit in the Conroe pool has been reduced from 154 bbl. to 144 bbl. per day, thus permitting the pool 62,500 bbl. daily from 435 completed wells.

Tomball—Texas Gulf

MAGNOLIA PETROLEUM COMPANY (Socony-Vacuum) and Humble Oil and Refining Company (S.O.N.J.) No. 1 Kobs in J. M. Hooper Survey of Harris County topped Cockfield formation at 5,343 ft. and drilled to 5,569 ft., encountering oil saturated sand at 5,547 ft. On production test No. 1 Kobs made 1,660 bbl. initially of 41 gravity oil through ½-inch choke, thus finally proving for production the Tomball area, which witnessed one of the wildest pre-discovery booms in United States. The production in No. 1 Kobs was somewhat unexpected because the same companies' No. 1 Martens, 3½ miles due north northeast, correlating but little lower structurally tested salt water in the Cockfield formation, and has been abanded as dry.

Regionally the discovery of commercial production in the Cockfield formation in the Tomball district is of very considerable importance, definitely extending the "Conroe" trend some 20 miles due southwest, and opening for intensive wildcatting additional territory.

The discovery well in Tomball, No. 1 Kobs, is located about 1½ miles within a solid block of leases held by Magnolia and Humble Companies, and the area to the south of the well is also held in a solid block by the Humble Oil and Refining Company, with only The Texas Company breaking the block by holding four leases totalling about 700 acres. The danger of over-drilling and rapid development will occur only if the field extends 1½ miles north, where leases have been taken up by several major and small operators. The Tomball townsite proper and adjoining small truck farm tracts appear to be condemned at this time by No. 1 Martens.

Humble and Magnolia's No. 1 Rudel in Joseph House Survey, halfway between No. 1 Kobs and No. 1 Martens (abandoned at 7,438 ft.), after drilling Hocklyensis formation 150 ft. higher than Kobs and 170 ft. higher than Martens, cored 16 ft. saturated sand at a total depth of 5,468 ft. Casing is now being run for completion with indications that this will be a much larger well than the discovery. Apparently the most prolific portion of Tomball is this part of the field where Humble and Magnolia block is broken by Stanolind, Continental and Texas Company leases.

Humble Pipe Line Company will complete shortly a combination eight- and six-inch pipeline from the Tomball field to its terminal at Houston, a distance of about 20 miles; and Magnolia Petroleum Company announced plans for an eight-inch pipeline from the new pool, connecting with its Conroe-Beaumont trunk line.

Garwood—Colorado County: Texas Gulf

PLYMOUTH OIL COMPANY No. 1 Ream in I. and G. N. 47 Survey encountered sand at from 6,194 to 6,204 ft. and was completed for 500 bbl. of oil through ½-inch choke, the oil being accompanied by around 20,000,000 cu. ft. of gas. No. 1 Ream is 1½ miles due southwest from Coyle Concord Oil Company's No. 1 Nelson, a wet gasser completed in 1932 at a depth of 4,052 ft. and the first well to produce oil or gas in Colorado County, some 40 miles from any other field.

The Garwood district appears as a very promising area for future development and a field of considerable importance will probably be opened in the immediate vicinity of No. 1 Ream.

Humble Oil and Refining Company (S.O. N.J.), subsequent to completion of No. 1 Ream, exercised its option and bought half interest in the Coyle Concord Oil Company's block of about 15,000 acres, adjoining Plymouth Oil Company's 4,000-acre block on the north, for $150,000 cash and $1,759,000 out of 7/32 of first oil produced, thus continuing its very active policy of purchasing large interests in the newly discovered Gulf Coastal fields.

Livingston: Texas Gulf

RICHARD SCHWAB No. 1 Craig Heirs in Barry C. Swinney-Augustine Viesca Survey of Polk County was completed as a second oil well in the Livingston field, producing 800 bbl. initially through ¾-inch choke from a total depth of 4,328 ft. in the Cockfield formation. The new producer is the north offset of Shell Petroleum Corporation's No. 1 Davis-Holmes, the discovery oil well in the field. The performance of No. 1 Davis-Holmes and No. 1 Craig Heirs to date, as well as the completion of several dry holes near these producers, suggests that the Livingston pool will prove to be of but secondary importance.

Hollow: Western Kansas

A FOURTH major oil producing horizon, the Simpson "Wilcox" sand of Ordovician age, was found to be productive in the Hollow field of Western Kansas (No. 39 on WORLD PETROLEUM map published on page 107 of March 1932 issue).

Within the last month the Producers and Refiners Corporation No. 2 Martens and Skelly Oil Company No. 3 Martens, both in section 19–T22S–R3W were completed as 1,200 to 1,800-bbl. wells from 3,508–3,514 ft. and 3,545–3,549 ft. respectively, while two miles due north Derby Oil Company No. 2 Schmidt in section 17–T22S–R3W was swabbing 65 bbl. per hour from 3,567–3,574 ft., all three wells producing from the "Wilcox" sand.

The production of oil in the "Wilcox" sand in the Hollow field places that pool in the ranks of the most prolific in Western Kansas. To date four producing horizons have been opened in the Hollow field:—the Kansas City sandy limestone, the Mississippi limestone, the Hunton limestone and the Simpson "Wilcox" sand; a total of about 35 wells having

been completed in the field, which measures now three miles in length and one mile in width. With a potential of around 35,000 bbl. per day the Hollow pool now averages about 7,000 bbl. per day, partly shut-in because of the producers' strike.

Due to considerable regional improvement in the sand conditions of the Simpson series in a southerly direction the "Wilcox" sand production in the Hollow field is expected to be more prolific than in the Voshell pool, six miles due north, while further south in the Study-Burrton field, now producing only from shallower Mississippi limestone, similarly a large oil pool may be anticipated in the "Wilcox" sand, thus considerably augmenting oil reserves of Western Kansas.

Central Oklahoma

IN THE LUCIEN field the Lucien Consolidated No. 1 E. Farr in section 19–T20N–R2W was completed in the "Wilcox" sand of Simpson series of Ordovician age at a total depth of 5,133 ft. and flowed initially 1,330 bbl. in 4½ hours, or at the rate of 7,000 bbl. per day. Shell Petroleum Corporation No. 1 M. Farr in section 19–T20N–R2W, one-half a mile due south from No. 1 E. Farr, correlated structurally very low, and was abandoned at 5,387 ft. after encountering salt water in the Simpson section, thus defining the Lucien field on the south.

Future development of the Lucien field will depend on the decision of the State Corporation Commission on the application of the Shell Petroleum Corporation to allow the field a proration allowable of 12,000 bbl. per day, instead of the current wildcat allowable of 50 bbl. per well per day. If a satisfactory allowance is granted to the new field, then several additional wells will be drilled, though in any case development of the Lucien field will be slow, and the spacing of wells will be limited to one well to 40 acres. Shell Petroleum Corporation is completing a pipeline from the Lucien field, connecting it with the company's trunk line near Tonkawa, Oklahoma.

Shell Petroleum Corporation et al. (unitized block) No. 1 Faulkner in section 11–T15N–R4W, a wildcat, located on Navina core-drill and seismograph prospective structure, apparently discovered a new field in Central Oklahoma on the Oklahoma City-Garber major trend, when it found basal Pennsylvanian and pre-Pennsylvanian formations greatly thinned out and partly missing, shortening the section by some 350 ft. On June 20 No. 1 Faulkner was preparing to test the Simpson sand series after setting eight-inch casing at 6,381 ft.

The Gypsy Oil Company (Gulf) No. 1 Miller in section 22T–17N–R4W was correlating very high structurally and drilling at 6,080 ft. in Simpson series and the Barnsdall Oil Company's No. 1 Waltermire in section 33T–21N–R1W was drilling at 4,556 ft., also considered a prospective Simpson sand producer, thus apparently adding three new fields to Central Oklahoma.

BASIL B. ZAVOICO

RUSSIA

Official Figures for Soviet Oil Operations*

1933	Crude Production (Bbl.)	Daily Average (Bbl.)	Run to Stills (Bbl.)	Drilling (Feet)
January	10,382,400	334,917	9,510,900	157,486
February	10,162,600	362,950	9,167,900	169,396
March	11,928,700	384,800	11,003,300	228,534
April	11,824,400	394,150	10,472,700	228,790
May	12,794,600	412,729	11,834,900	213,744
Total	57,092,700	378,097	51,989,700	997,950
Total first quarter 1933	32,473,700	360,820	29,632,100	555,416
Total first quarter 1932	39,106,200	430,550	36,223,482	586,150
Revised quota total 1933	170,800,000	467,670	155,000,000	3,515,000

*Conversion Ratio: Seven Barrels—One Ton.

Lok Batan

THE WORLD'S fourth most powerful gusher, No. 45 at Lok Batan field controlled by Azneft and flowing between 100,000 bbl. and 150,000 bbl. daily which came in on May 18 has put the entire Soviet oil industry in a position to fulfil the production quota for the first time since the beginning of the year. No. 45 is producing from the middle of five known strata at 1,689 ft. and the vast quantity of oil produced has necessitated the construction of earthern reservoirs and the hasty finishing of pipeline links to the Stalin group of fields and to the Baku-Batum trunk pipeline. Work has been going on night and day to keep the earthern reservoirs in repair; but on at least one occasion toward the end of May the vast flood of crude broke through and inundated a considerable area as shown in the accompanying illustration.

Drilling at Lok Batan was being carried on as the result of several years careful work on the part of geologists who persisted in spite of the fact that because of its situation near a mud volcano the field was considered a poor prospect. There are at present 15 exploratory and 10 producing wells in the Lok Batan area while immediate plans are being made to rush drilling in this section. The crude produced contains about 40 percent light fractions.

Drilling and Production

PRODUCTION increases are also reported from other fields of the Baku group, although Lok Batan succeeded in fulfilling the Baku quota for May in less than 25 days of that month. Grozneft, however, is still considerably short of fulfilling its requirements, production amounting to 87,500 bbl. to 92,700 bbl. daily against the 112,000 bbl. required.

Drilling continues to be the worst division in the industry, being some 30 to 40 percent in arrears of the plan. Departments have been linked under one management and every effort made to facilitate operations but so far without complete success. At the All Russian Conference on Deep Drilling, Mr. Damanski opened the proceeding with a talk on the shortcomings of the Soviet industry in regard to deep drilling. Due to lack of coordination between various departments and inability to readjust operations to the different technique required by deep drilling very little had been accomplished either in Baku or Grozneft. At Emba the two deepest wells in Russia have been drilled to a depth of 7,260 ft. and 9,240 ft. respectively but the equipment was not adequate to give practical results. Crookedness developed in both wells and in one case has already reached 21 degrees. Mr. Damanski also mentioned that while good results were being achieved with imported bits, the lack of uniformity in tools used and the poor quality of pipe supplied from domestic sources has so far proved a considerable handicap to deep drilling.

Current Events

NEFTDAG. Delay in reconstruction of the railroad link to Neftdag is holding up operations there because of lack of water and supplies and is permitting large quantities of crude to accumulate in earthern storage. Flush production of the two main producing wells has stopped temporarily but drilling on the remaining wells continues.

SIKTIVKAR. All exploration in the Ukhta field has been completed and the first shipment of oil has been taken out by caravan.

TIFLIS. In the Mirsaani oil field of Grusneft (Georgia) two new gushers have been opened flowing about 700 bbl. of crude per day.

SVERDLOVSK. A refinery with a capacity of 560 bbl. of crude per day has been completed

for operation in the Ural oil fields at the Upper Chussoff Village.

GROZNI. The Malgobek-Becovitchi 12-inch pipeline has been completed over a distance of 5.25 miles in four days. The Malgobek field is a recent discovery and is expected to be turned over shortly for commercial exploitation.

German Difficulties

REPRESENTATIVES of Derop, Soviet sales agency in Germany, announce that difficulties between their company and the German authorities arising out of the police raid on the company's headquarters have been adjusted satisfactorily. At the time of the police raid evidence of communistic activity on the part of employees of Derop was announced by the police and a government manager was placed in charge of Derop for the purpose of checking that side of its activity and regulating matters of policy. Derop's trade in Germany will now be able to proceed without difficulty.

The German market has been of great importance to the Russians who have increased their share of the German market from 11 percent in 1930 to 26 percent in 1932, having dropped out of the Cartel early in 1932. Russia's share of the market declined in the second half of 1932 to 17 percent, however, and during the first quarter of 1933 to but 13 percent. Soviet success in the German market was largely due to her aggressive price policy which was abandoned in October of 1932 when Derop again joined the German Cartel and has since adhered strictly to price agreements. Without an adjustment of prices Derop had no special inducement to offer purchasers, and, as in some cases the quality index of her products had declined, her sales suffered.

In 1932 Germany imported 8,675,128 bbl. of gasoline of which the United States supplied 30.4 percent, Russia supplied 25.4 percent and the balance came from South America, Persia, Roumania, Netherland India and others. She also imported 776,995 bbl. of kerosene of which the U. S. supplied 57.3 percent against Russia's 23.7 percent; 2,826,437 bbl. of fuel oil, of which 36.4 percent came from the U. S. and 24.8 percent came from Russia; and finally 2,170,700 bbl. of lubricating oil, 35 percent of which came from the U. S. against 31 percent from Russia.

Oil flood from the world's fourth most powerful gusher inundating Lok Batan in Soviet Russia.

© International News Photo

Soviet Oil Exports by Products

(Barrels)

	First quarter 1933	First quarter 1932
Crude	153,346	732,578
Motor fuel	2,626,204	3,859,100
Kerosene	1,470,861	1,494,206
Solar oil	87,234	102,858
Lubes	297,500	307,832
Fuel and Diesel	2,658,420	2,881,655
Gasoil	1,004,010	815,024
All others	30,604	47,565
Total	8,328,179	10,240,818

Soviet Oil Exports by Countries of Destination

(Barrels)

	First quarter 1933	First quarter 1932
Italy	1,539,398	1,657,663
France	1,423,527	1,710,709
England	1,053,731	1,432,382
Germany	692,202	987,007
Spain	469,042	729,442
Belgium	490,287	556,969
Sweden	301,553	398,223
British India	327,530	359,317
Egypt	340,207	273,721
Denmark	210,581	125,342
China	246,519	88,382

Rumors have been current that Germany has extended RM. 200,000,000 credit to Russia, presumably to meet present obligation of the Soviets in Germany. Following this, on May 25, a new board of directors and advisory board of Derop was elected and is at present organized as follows: Mr. Weitzer, Soviet trade representative in Germany, having Messrs. Nashkevitch, Volfson, Cherniak, Chukhman and Gorski as assistants; new members elected on May 25 are Messrs. Thyssen and Kloekner, German industrialists, Mr. Klotzbach, director of Krupp, Mr. Ahlners, president, Union of German Autocar Manufacturers, and Mr. Schwartz, director, Dresden Bank.

Soviet Export Trade

AS AN EFFECT of the trade embargo placed on Russian oil by the British government the tanker LONGFORD with a cargo of 70,000 bbl. of Russian oil products has been directed by R.O.P. to land its cargo at Cork in the Irish Free State. Heretofore products were supplied to the Irish Free State from R.O.P. storage in England. At the same time officials of the R.O.P. announced that they were in a position to supply Irish requirements direct from Black Sea ports at advantageous prices.

Expiration of the trade agreement with Latvia has led to temporary suspension of imports from Russia. Latvia consumed in 1932 some 40,000 bbl. of motor fuel and 150,000 bbl. of kerosene of which Russia supplied over 50 percent via the Baltic. A new trade agreement is being negotiated.

Decreasing production, increasing consumption and irregularities of operation have led to a 17 percent decline of oil exports from Russia during the first quarter of 1933 compared to the corresponding period of 1932 which has been accompanied by an 18 percent decline in the value of these exports from Rbl. 28,000,000 in 1932 to Rbl. 23,000,000 in 1933.

Due to existing contracts the Soviet industry did not begin to feel the effects of the world wide depression as soon as most other oil exporting countries; but it is finally beginning to show the accumulated effects of decreased world consumption, demands for retention of production in Russia and competition from overproduced, low priced, United States oil. Domestic consumption has actually increased only in the use of tractor fuel due to mechanization of agriculture and the growing use of tractors in Russia. Other petroleum products have been strictly rationed out, industries have been urged to use substitutes for fuel oil wherever possible, and motor fuel is issued only on application by holders of permits.

Konstantin Riabovol, whose transfer from head of Soyusnefteexport to director of Grozni was reported in the preceding issue of WORLD PETROLEUM, stated on leaving the export organization that petroleum exports had brought in Rbl. 600,000,000 mostly in the form of imported goods for the industrialization of Russia. Mr. Riabovol pointed out that progress was being made toward eliminating the disparity between U. S. production and that of the Soviet Union with Russia increasing her share of world prdoduction from 6.4 percent in 1928 to 11.6 percent in 1932 while the United States share decreased from 68.1 percent in 1928 to 60.6 in 1932. In obtaining second place in world production by exceeding the output of Venezuela, Russia now has production exceeding that of the Royal Dutch-Shell group which in 1923 was 16 percent of the world total, against Russia's four percent. In 1932 the Group's percentage had declined to 10.5 percent. The increasing share of various European markets and the opening up of new markets as well as the development of sales agencies in various countries were pointed out as important accomplishments in Mr. Riabovol's statement. Mr. Riabovol credited the Soviet system of directing the entire export business of the country as a single unit with the success that has been achieved in the petroleum export trade by Soyusnefteexport.

Soviet April Exports

(Barrels)

	April 1933	April 1932
Crude	163,387	.....
Motor Fuel	1,153,565	1,103,123
Kerosene	599,487	396,620
Lubes	253,344	136,255
Fuel oil	1,675,590	1,514,982
Other products	636	2,114
Total	3,846,009	3,153,094

J. WEGRIN

ROUMANIA

BUCHAREST, ROUMANIA

ONLY FEAR of the chaotic conditions that would result have succeeded in keeping Roumanian producers within the terms of the Paris agreement while a strong feeling is developing here that they are the only parties who have lived up to the terms of the agreement. None of the expectations that they entertained at the time of the agreement have been realized and their position is becoming more difficult. Not only have they made the sacrifice of reducing production by 23 percent, not only have product prices fallen since then, but great difficulty is experienced in disposing of products on the European market. While 182,400 bbl. produced in November, 1932 was not sufficient to meet the requirements for Roumanian products, 140,600 bbl. produced in conformity with the agreement was disposed of only with the greatest difficulty.

Finally a crisis was reached at an important meeting of petroleum producers in Roumania on May 30 when Steaua-Română announced that the Paris agreement had actually ceased to exist when evidence had appeared that there was no control over U. S. production, and that their company had given orders to open production on wells without regard for their quota under the Roumanian domestic agreement. They refused to accept a higher quota which other companies were willing to grant and they refused to delay action for a few days to discuss the matter further. They did, however, see the necessity for a domestic agreement.

Other companies at a second meeting on June 1 agreed to maintain their quotas for a few days at least, to see if some domestic action might not be made effective in the hope of maintaining export prices. While refinery gasoline prices have fallen to disastrously low levels since October, kerosene at the refinery is quoted at 20 s. 2 d. against 9 s. 2 d. last October while motorine is quoted at 16 s. against 4 s. 3 d. last October. Fuel oil also commands a better price and it is the hope of maintaining these prices that has encouraged the other Roumanian producers to hope that a meeting can succeed in creating an export organization to eliminate competition between producers on foreign markets. At the same meeting an effort will be made to revive the question of a domestic cartel. Representatives will be appointed to negotiate with cartels of the Central European countries.

Production from the Gura-Ocnitei-Gorgoteni field, from the Meotic sand, is declining rapidly. It is another example in Roumania of uneconomic exploitation of an oil field. Too many wells have been drilled at unreasonable distances from each other, and just as happened at Tuicani, gas pressure, and consequently productivity have been impaired.

Two companies, however, Creditul-Minier and Prahova, both of which have obtained state perimeters, will explore soon the continuation of the Gorgoteni anticline, north of the town of Târgoviste, and six to eight miles west of the present field.

Creditul-Minier has obtained very good results from their exploration well at Hârsa, on the continuation of the Boldesti anticline, about three and a half miles east of that region. They struck the first Meotic oil sand at 7,741 ft., this well being the deepest in Roumania. The well began to produce 1,260 bbl. per day, through nine mm. beans, the pressure being 97 atm. in the casing and 35 atm. in the tubing. The well produces now 1,960 bbl. per day through 16 mm. bean. This well has opened a new and very interesting field where the Creditul-Minier Company possesses some 400 hectares of land.

The Astra-Română drilled and explored with very satisfactory results the northern flank of the Boldesti anticline, their well there giving some 1,976 bbl. per day.

At Aricesti the two Steaua-Română wells produce 760 bbl. and 1,596 bbl. per day. This company will soon bring in two more wells. The Unirea and the Româno-Americana Companies have also started to drill in this field.

E. I. MARGULIUS

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CANADA

Imports

IMPORTS of crude into Canada during the month of April showed a heavy falling off, being 907,094 bbl. compared with 1,409,609 bbl. in March. The total for the twelve month period ending April 30, 1933, was 23,442,622 bbl. valued at $23,647,512, compared with 28,717,965 bbl. valued at $21,994,299 during the same period ending April 30th, 1932. Imports of crude not in its natural state totalled 83,951 bbl. in April. It is interesting to note that the importations of this grade for the twelve month period ending April 30, 1933, totalled 683,202 bbl. compared with only 106,345 bbl. during the corresponding period last year.

Gasoline imports remained at very much the same level as in March, being 51,557 bbl. compared with 45,940 bbl. in the previous month. Importations during the twelve month period ending April 30 were 1,800,304 bbl. compared with 2,359,293 bbl. in the corresponding period of last year.

Imperial Reports Lower Earnings

A REDUCTION in the consumption of petroleum products, principally in the prairie provinces, and a contraction in the margin of profit on each unit of sale is reflected in the annual report of Imperial Oil Company for the year ended December 31, 1932. Net per share after providing for depreciation and Dominion income tax was equal to 54.93 cents as compared with 68.16 cents in the preceding year.

The income from Canadian business, comprising all refining and marketing operations, amounted to $4,331,157, while income from transportation was $1,070,220. Other net income for the year under review, being rents, interest, dividends and income received from investments outside of Canada, amounted to $9,311,798. In this year's report net income is shown after Dominion income tax.

The balance sheet shows total assets of $260,916,033, up from $255,757,758. Cash is reduced almost $3,500,000 to $13,816,336; receivables down over $4,000,000 to $13,804,235; inventories down $5,000,000 to $26,661,474. Other assets, including stocks of other companies and government bonds, are up $11,000,000 at $78,844,011. Reserves are almost $3,000,000 higher at $67,241,734, and total surplus up $1,500,000 at $109,958,798.

Total current assets dropped to $57,204,973 from $66,752,422, and current liabilities increased from $6,474,039 to $7,894,426, leaving working capital down $11,000,000 to $49,310,547.

In his report to shareholders President C. O. Stillman says in part:

"The wholesale price index of commodities in Canada during 1932 averaged 104.6 percent of the 1913 level. Petroleum products in Canada averaged 84.1 percent of the 1913 price level, but the advantages which the consumer might have enjoyed from this favorable relation of prices were offset by the heavy

taxes imposed on gasoline. During the past ten years, as the price of gasoline has been reduced, the road tax has been increased to an almost equal extent, and last year the tax was raised to six cents in Prince Edward Island, Nova Scotia, Ontario and Saskatchewan, and to seven cents in New Brunswick, Manitoba and British Columbia. The six-cent road tax became effective in Quebec province in December, 1931. . . .

"Your company drilled only one well in the west last year. This was in the Lethbridge area and was abandoned at 4,578 ft. as a dry hole.

"Production in the Turner Valley was curtailed in accordance with the Alberta Government's conservation regulations. The output of naphtha and crude oil from the Turner Valley totalled 875,810 bbl. Imperial Oil and its subsidiary and associated companies contributed 457,353 bbl. or 52 percent of this. Future activities of your company which controls 52 productive wells in the Turner Valley will be regulated by the government's conservation program. . . .

"Production of crude oil in Colombia totalled 16,417,125 bbl. or 44,856 bbl. daily, as compared with a total of 18,237,190 bbl. in 1931. The potential production was greatly in excess of the crude oil produced and the curtailment was voluntary. Drilling was restricted to proven structures and consisted principally of completing wells to a shallow producing horizon and deepening older wells to lower productive sands. Thirty-two new wells were drilled. Twenty-six of these were at Infantas and averaged initially 179 bbl. daily. Six were at La Cira and averaged 603 bbl. initially. Fifty-four wells were deepened with satisfactory results. The small amount of drilling involved in bringing in the shallow wells and deepening the older producers resulted in development of relatively low cost crude.

"Twenty-three of the shallow wells completed extended the proven area of the upper producing zone at Infantas and added to the field reserves.

"A notable achievement in efficiency and economy was the elimination of all gas wastage.

"Crude oil production from La Brae y Parinas Estate in Peru was 7,635,681 bbl. or 20,826 bbl. daily average as compared with a total of 7,675,719 bbl. or a daily average of 21,029 bbl. in 1931. This voluntary curtailment was made to adjust output to the available markets. At December 31, 1932, there were 1,813 producing wells in the field. Production of casing-head gasoline was 783,605 bbl.

"Total shipments of crude oil and products were 8,220,374 bbl. Of these shipments 44.2 percent went to Europe, 37.6 percent to South America and 18.2 percent to Canada."

R. C. ROWE

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MEXICO

Refinery Construction

A REFINERY designed to produce a full line of products is being completed at Tampico by the Administrative Control of National Petroleum (Federal Government Agency) according to an announcement of the Ministry of National Economy. The plant will be formally inaugurated as soon as the cracking unit is completed. The statement explained that the Administrative Control had been obliged to establish its own refinery in order to save the expense of having its increased production from Federal oil zones in northern Vera Cruz state and the Isthmus of Tehuantepec region refined in plants belonging to private companies organized outside Mexico.

Drilling

EL BURRO zone, northwestern part of the Isthmus of Tehuantepec, has been extended 1,287 ft. by the completion of a producing well at a depth of 2,513 ft. with initial daily production of 750 bbl. by the Mexican Eagle Oil Company (Royal Dutch-Shell). This zone was first developed in January, 1931, and all its wells are good producers. At present it covers an area of 5,350 ft. east and west and 3,850 ft. north and south. Two more wells in this field have recently been brought in by Mexican Eagle, one at El Plan ranch at a depth of 2,150 ft. with daily production of 125 bbl. and the other on the Gavilan del Norte ranch with initial production of 40 bbl.

The Mexican Gulf Oil Company has brought in a 250 bbl. daily producer at 1,803 ft. on Chapacao ranch, Panuco municipality, Vera Cruz, according to an announcement of the Ministry of National Economy.

Exports

MINISTRY of Finance announces that exports for the first quarter of 1933 amounted to 4,504,995 bbl.

Mexican First Quarter Exports

Product	Barrels
Heavy crude	1,720,819
Fuel oil	1,274,323
Gasoil	736,173
Gasoline	429,632
Kerosene	90,776
Lubricants	45,407
Asphalt	207,865
Total (in terms of bbl.)	4,504,995

April exports were 14,321 tons of asphalt, 2,723 bbl. of crude and 72 bbl. of gasoline according to the Department of National Statistics, which finds that world markets for Mexican asphalt are steadily expanding.

The United States received by far the largest quantity of Mexican exports during January and February of this year and Great Britain received the greater part in March. The Mexican Eagle was the largest exporting company operating in Mexico, having supplied over 60 percent of the exports for the first quarter of 1933.

Taxes

GOVERNMENT income from production taxes increased during the first quarter of 1933, being $310,000 against $309,500 for the same period last year; export tax income, however, decreased from $205,000 for the first quarter of 1932 to $157,000 for the first quarter of 1933.

Labor Dispute

MEXICAN EAGLE has obtained a temporary injunction from a Mexico City district court judge against the ruling of the Federal Board of Conciliation and Arbitration requiring the company to pay its refinery workers an extra wage for service on Christmas day. The company contended that as Christmas fell on Sunday last year, and that in view of the fact that refining is an essential occupation the workers are not entitled to extra pay.

DOUGLAS GRAHAME

Measuring tanks, gas compressing plant and producing wells of El Aguila at Tonala, Mexico.

FINANCE

London: June

CONFLICTING factors operating on the oil share market during recent weeks have produced erratic price movements. Severe depression was caused late in May by the reduction of 2½d. per gallon in British petrol prices, and, as usual, the market has since been discussing the possibility of a further cut. The effect of such talk was largely offset by the suggestion from the United States that excessive East Texas oil production may before long begin to cure itself by natural causes. This put the market definitely better, and little attention was paid to cabled reports from Roumania that producers there were withdrawing from the international export scheme, owing to the absence of any effective price-raising move by the United States. The American position, nevertheless, remains the dominant factor in the London share market.

FULL accounts for 1932 of the two major companies in the Royal Dutch-Shell Group created a favorable impression and are dealt with in detail elsewhere in this issue.

ALTHOUGH Anglo-Egyptian, the Royal Dutch-Shell subsidiary, earned an increased profit in 1932, the company's ultimate future as a producing concern is obscure. Net profits last year were £194,393 compared with £161,709 in 1931, and the dividend was maintained at 10 percent, £142,370 against £134,-036 being carried forward. Total crude oil output was 1,826,160 bbl., the decline of approximately 140,000 bbl. from 1931 representing a normal decline of producing wells and the reduced amount of drilling performed in the last two years. Sir Reginald Macleod, the chairman, stated at the meeting that the company's one producing field in Hurghada is already showing signs of exhaustion. The company, however, is ready to finance a search for promising new territory provided that the Egyptian Government is willing to grant the necessary license, with the right to leases on terms which will justify the cost of exploration. Should all efforts fail to find new sources of production, exhaustion of the Hurghada field would, in the Chairman's view, only be a matter of time, thus forcing the company into the position of a mere refiner. Anglo-Egyptian, of course, already does considerable refining of imported products in addition to treating its own output.

KNOWLEDGE of the strong and liquid position of Burmah Oil Company's finances left little room for market surprise at the announcement of debenture redemption plans. Making the announcement at the annual meeting, Sir John Cargill, the chairman, referred to the low interest rates which the company is able to obtain on surplus revenues. These obviously make the redemption of a 5½ percent debenture issue a sound policy. The stock, of which there is £4,000,000 outstanding, will be repaid on January 1, 1934. Under the terms of issue it was repayable at par on November 1, 1953, or at 102 on any earlier date on or after January 1, 1934 at the company's option. Originally issued in 1928, the stock financed a large block of Shell Transport shares acquired by the Burmah Company to broaden the basis of the latter's investments in the industry. Conversion rights attach to the debentures, which it has never been profitable to the holders to exercise. Stockholders have the right up to November 1, 1933 to exchange each £6 of stock for one ordinary £1 share in the B. O. C. Anglo-Persian Share Trust which acquired 700,000 shares of the Burmah Company's holding in Anglo-Persian. Placing an option price of £6 on the Trust shares was a reasonable proposition when the Burmah debenture stock was issued. But that was before present depression overtook the world oil industry.

BY MAINTAINING earnings for 1932 at £112,341, against £113,889 in the previous year, Lobitos fully satisfied the market, while the repetition of the dividend of 12½ percent for the year was also well up to general expectations. The Peruvian operating company has continued to cut down its drilling program, and as a result further economies were effected. Constant writing down of development expenditure has left this company's 552 producing wells at a very low value, and a figure of £100,000 has been fixed by the directors as a valuation for the time being. In future all outlay on new drillings will be charged to revenue in the year in which it is incurred. As a result of better prices for its output, with profit on dollar exchange and the revaluation of its wells, the Peruvian Company eliminated the debit balance of £126,195 brought forward and paid a 4 percent dividend. This recovery, due largely to the conservative financial policy pursued in the past, assisted the holding company to offset the unfavorable results of its tanker fleet. The Lobitos tankers made a loss for the company for the first time in its history, and sales commission receipts also declined, although there was an increase in general dividend and interest revenue.

APEX (TRINIDAD) 51– shares advanced strongly to 1 3/16 following the declaration of an interim dividend of 12½ percent for the year to June 30, 1933. For 1931–32 the interim was 7½ percent, followed by a final distribution of 17½ percent, making a total of 25 percent for the twelve months. Over 36 percent was actually earned in that period, and the increase in the interim payment this year has encouraged the market to hope that the total return to shareholders will be raised to at least 30 percent.

NET PROFITS of British-Borneo Petroleum Syndicate for the 12 months to March 31 were the best reported since 1930. The total was £26,991, or considerably more than double the figure for 1931–32, and the dividend was increased from 5 percent to 7½ percent, although it was paid on a much larger capital. The company's principal interests include a joint holding with Anglo-Persian in a concession in Brunswick, Germany, a substantial block of Apex (Trinidad) shares, and royalty rights on oil produced in the Brunei Borneo field by British Malayan Petroleum Company, a Royal Dutch-Shell subsidiary. Shareholders were informed at the meeting that the Borneo oilfield is developing very successfully, increased royalties having apparently contributed largely to the better results presented by the company.

London Stock Exchange Prices

1933 High	1933 Low	Last Year's Div. %	Share	May 12 to June 12 First	High	Low	Last	Change
5/16	1/32	3½	Anglo-Ecuadorian	1/32	5/16	1/32	5/16	+ 1/32
1 5/16	1 1/32	10	Anglo-Egyptian "B"	1 1/32	1 5/16	1 1/32	1 1/32	– 1/16
2	1 3/4	5	Anglo-Persian	1 7/8	1 15/16	1 7/8	1 27/32	– 3/32
1 7/32	29/32	25	Apex Trinidad (5s.)	1 5/32	1 3/16	1 1/32	1 3/16	+ 1/32
17/32	1 1/32	....	Attock	1/2	17/32	15/32	15/32	– 1/32
5/16	1/16	7½	Brit. Borneo (6s.)	1 1/32	1 1/32	1/2	9/16	– 1/32
7/32	3/16	....	Brit. Burmah (8s.)	3/16	7/32	3/16	7/32	+ 1/32
5/16	1/32	....	Brit. Controlled (85)	9/32	9/32	7/32	1/4	– 1/32
1 1/16	1 1/32	....	Brit. Controlled Pfd. (85)	1 1/16	1 1/16	1/2	17/32	– 1/32
3 13/32	2 3/4	20	Burmah	3 9/32	3 13/32	3 1/4	3 1/4	– 1/32
1 1/32	1/4	....	Canadian Eagle (No par)	5/16	5/16	9/32	9/32	– 1/32
3/16	1/32	....	Kern River (10s.)	1/8	3/16	1/16	3/16	+ 1/16
1 15/16	1 1/2	12½	Lobitos	1 7/8	1 15/16	1 23/32	1 23/32†	– 1/32
4 5/32	3 7/16	14‖	London & Thames Haven	3 11/16	3 5/8	3 5/8	3 13/16	+ 1/8
13/32	5/16	....	Mexican Eagle ($4 Mex.)	3/8	3/8	1 1/32	3/8	.....
9/16	3/8	....	Phoenix	17/32	17/32	15/32	1/2	– 1/32
20 7/16	15 5/8	6	Royal Dutch (fl. 100)	18 3/4	20 7/16	18 3/8	20 7/16	+ 1 1/16
2 17/32	1 29/32	7½*	Shell Transport	2 3/4	2 13/32	2 1/8	2 3/8†	+ 1/8
10 1/8	5 7/8	....	Shell Union (No par)	8 1/2	10 1/8	8 1/4	9 1/2	+ 1
17/32	1 1/32	4	Steaua Romana	7/16	15/32	13/32	7/16	.....
2 31/32	2 9/32	12½	Trinidad Leasehold	2 13/16	2 13/16	2 7/16	2 9/16	– 1/4
5/16	3/16	....	Untd. Brit. of Trinidad (6s. 8d.)	9/32	9/32	1/4	1/4	– 1/32
1 7/8	1 1 3/32	12½	Venezuelan Oil Concessions	1 23/32	1 7/8	1 21/32	1 23/32†	– 1/16

Nominal value of shares or units £1 unless otherwise stated by bracketed figures.
*Denotes Tax-free dividend. †Denotes "Ex-dividend" price.
‖10 percent dividend tax free plus 4 percent bonus less tax.

THE MARKET was pleasantly surprised at the declaration of a 7½ percent dividend for 1932 against 5 percent for 1931 by the Anglo-Persian Company. Profits after full provision for all royalty and tax payments due the Persian government under the recent settlement amounted to £2,379,677 against £2,218,717 for the preceding year. Funds carried forward were reduced from £720,129 in 1931 to £447,269 in 1932. The directors consider this carry forward adequate. The company is considered fortunate to be able to liquidate tax and royalty payments and show a profit at the same time. Their good showing in this regard is ascribed to the board of directors' consistently sound financial policy.

ALEC H. DAY

Paris: June

OIL SHARES on the Paris Bourse have established new high levels during the past month—a fact which appears somewhat astonishing if one takes into consideration all the happenings in the oil industry which should normally have had a depressing rather than a stimulating effect.

There is, to begin with, the very considerable increase of overproduction in the United States, the fact that the Roumanians are ready to break the Paris Agreement at any moment if steps are not taken to reduce the said production immediately; a reduction of 2½d. per gallon in the price of petrol in England, and, finally, until a few days ago, the menace for the French oil industry of seeing a petroleum monopoly instituted by the government in spite of opposition from the senate.

There have, of course, been some encouraging factors as for example the rumor that salt water had appeared in some of the wells in Texas; that President Roosevelt's bill for the reduction of production had been adopted, and that a move had been made in the States by the different companies to raise the price of crude oil.

Publication of the Royal Dutch Companies' balance-sheet was also responsible for some optimism and sent Royal Dutch ordinary shares flying up to Fr. 17,400 (the highest level attained this year), with other shares in its wake.

ALTHOUGH it cannot be said that the Compagnie Française des Pétroles has played a leading part in the French oil industry until the present, it is now on the verge of doing so. For the first time since the company was founded nine years ago, the directors have this year had the pleasure of informing shareholders that certain parts of the companies' initial program have been completed and that the remainder are in the process of execution. This is the case more especially with regard to the Compagnie Française de Raffinage which is already refining small quantities of products in Normandy and will, next year, doubtless, be in a position to show a good turn-over.

Building on the Martigues refinery is progressing slowly but surely and it will be in working order by the time the Iraq pipeline is terminated.

Methodical research work is being pursued at the Compagnie Française de Raffinage's most up-to-date laboratory in Paris and the company's interests in the French colonies have not been neglected although not much information is obtainable in this connection.

Without a doubt, however, it is the development of the Iraq oilfields which is of vital importance to the Compagnie Française des Pétroles and until regular supplies of oil arrive from that country, the company's progress must necessarily be retarded. This does not mean, however, that the Compagnie Française des Pétroles has not done its full share of work in connection with the opening up of the Kirkuk field and the laying down of the Iraq-Mediterranean pipeline. On the contrary, the French have shouldered their share of the burden and the anxieties. They have invested Fr. 63,170,740 in the pipeline i.e. 23.75 percent of the total capital. Directors of the Compagnie Française des Pétroles appear extremely satisfied with the progress which is being made in Palestine and have stressed the fact that the expenses of laying down the pipeline had been over-estimated and have been reduced by almost 25 percent since work was started.

The company's balance sheet for 1932 submitted to the shareholders on June 7, showed capital expenditures of Fr. 482,957, cash and bank deposits of Fr. 11,487,800 against 98,182,201 in 1931, and total assets of Fr. 337,343,653 against Fr. 318,308,598 in 1931. Expenses for the financial year were Fr. 1,916,579 against 2,919,055 in 1931. Balance carried forward at the year end was Fr. 3,353,760 against Fr. 1,248,849 in the preceding year.

At the general meeting Boris Aslan Finaly, Banque de Paris et des Pays-Bas and the Standard Franco-Americaine and Paul Louis Weiss, Raffinerie de Petrole du Nord were elected directors in place of Admiral Grasset (deceased) and M. Jouasset (resigned).

THREE YEARS have elapsed since the Société Anonyme Steaua Française last paid a dividend, but it is only fair to add that no dividend was forthcoming because the board of directors had decided to consolidate the company's financial position by reducing its capital and by putting large sums aside for amortizements. This extremely cautious policy is now bearing fruit and although shareholders have had a hard time lately a reward is in store for them this year in the shape of a 5 percent dividend (Fr. 25) and the hope of more to come next year.

Profits for 1932 amounted to Fr. 7,864,445 as against 9,637,274 last year and 8,456,405 in 1930. Most of this sum is to be written off to compensate depreciation in the company's investments and it has been decided to pay the dividend out of the special reserve fund.

That the directors of the Steaua Française have been successful in consolidating the company's financial position is proved by three factors:

Capital has been reduced from Fr. 115,000,000 to Fr. 97,000,000.

Royalties owed by the Steaua Romana to the Steaua Française have been reduced from Fr. 32,700,000 to Fr. 17,225,000.

Depreciation of investments, after amortizements, has been reduced from Fr. 55,606,931 to Fr. 41,897,698.

Furthermore, the Steaua Française has steadily increased its activities at home and abroad. Through the intermediary of its subsidiary companies engaged upon distributing products in the South of France and in Morocco, Steaua Française sold 4,944,000 bbl. of products during 1932 as compared with 4,652,000 bbl. in 1931 and 2,800,000 bbl. in 1930. This increase of 292,000 bbl. over last year's sales has chiefly been achieved in Northern Africa and on other European markets; France having shown a slightly less favorable return, last year.

From the shareholders' point of view, there is another distinct improvement in the company's position, for whereas this time last year Steaua shares were quoted around Fr. 195 on the Paris Bourse, they are now worth Fr. 344 and have a general tendency to rise. This, in face of overproduction, the extremely poor results obtained by Roumanian companies where prices are concerned, and all the other catastrophes which have assailed the oil industry, is by no means a mean result and should encourage shareholders to have faith in their board of directors and the way in which it is managing the affairs of the company.

E. J. ANDRE

(Continued on page 234)

Paris Bourse Prices

1932 Div.	Par.	Share	May 9 to June 8 First	High	Low	Last	Change	Position on June 8 1932
....	500 Lei	Astra Romana	72	79	67	76	+ 4	39
....	500 Lei	Colombia	50	71	50	71	+ 11	45
10 Lei	500 Lei	Concordia	47	52	45	49	+ 2	32
....	500 Fr.	Franco Pol. Pétroles act	171	234	171	234	+ 63	32
....	10$	Franco Wyoming	176	215	170	211	+ 34	135
....	500 Fr.	S. G. des Huiles de Pétrolé act	357	408	325	404	+ 47	177
....	....	" " part	66	96	63	95	+ 29	50
....	500 Fr.	C. Française des Pétroles	500	526	500	510	+ 10	400
40 Fr.	500 Fr.	C. Industrielle des Pétroles	375	430	350	430	+ 55	....
45 Fr.	500 Fr.	Lille Bonnières Colombes prio	805	835	747	790	− 15	595
20 Fr.	500 Fr.	" " ord	499	516	490	511	+ 12	340
....	....	Malopolska act	16	1,825	16	18	+ 2	16
....	....	Malopolska part	95	102	75	102	+ 8	150
....	....	Mexican Eagle	38	43	36	42	+ 4	33
5 Fr.	250 Fr.	Omnium Inter. des Pétroles	56	85	55	71	+ 15	60
50 Fr.	500 Fr.	Pechelbronn	301	310	300	309	+ 8	330
45 Fr. B.	500 Fr. B.	Petrofina	440	450	416	432	− 8	330
5 Fl.	1000 Fl.	Royal Dutch	16,100	17,400	15,800	17,250	+1,150	11,520
5 Fl.	100 Fl.	Royal Dutch 1/10	1,615	1,740	1,590	1,727	+ 112	1,150
1/5 d.	1	Shell	203	216	190	212	+ 9	150
....	500 Fr.	Steaua Française	342	352	322	344	+ 2	195

'S. & L.' steel pipes with Victaulic joints are specially suited for oil or water lines on jetties and where there is vibration: the joints are easily fitted in restricted spaces.

STEWARTS AND LLOYDS LTD

GLASGOW + BIRMINGHAM + LONDON

New York: June

ACCOMPANIED by heavy volume, stock prices in June pushed into new high territory, spurred by further advances in commodity prices and generally favorable business news as well as continued weakness in the dollar abroad. The most important developments of the month were the adjournment of Congress after completing one of the most extensive legislative programs in history, and the convening of the Economic Conference in London. Congress completed its work by passing the National Industrial Recovery bill encompassing a new relationship between government and business and designed to coordinate the forces of industry, increase employment and raise the general purchasing power of the country as a prerequisite of economic recovery. Coupled with the passage of this important piece of legislation a huge public works program was authorized, calling for the expenditure of $3,300,000,000 for the construction of public works, roads and other projects on a large scale. It is expected that this program combined with the easy money policy of the Federal Reserve will prove a powerful stimulus to further improvement in general business conditions.

The June 15th instalments on war debts were met in full by only one country, Finland. England, Italy and several of the smaller countries avoided technical default by making "token" payments, representing a small fraction of the payments which fell due. France for the second time made no effort to meet her obligation. The administration at Washington in a sharp note to the debtor countries served notice that each country's status would be examined individually and treated according to the merits of the individual case. This action followed the thrusting of the war debts issue into the forefront of the Economic Conference. Shortly afterward it was reported that the conferees had agreed upon a temporary stabilization plan for the dollar and the pound. The stock market broke sharply upon receipt of the news, indicating the part that inflationary sentiment has played in the speculative markets, but quickly regained most of the losses upon assurance from Washington that no effort would be made to attain an early stabilization of currencies.

Oil shares have been generally strong in recent market sessions reflecting the improved status of the industry as a result of the sharp reduction in the East Texas allowable production and higher oil prices generally. Second quarter reports on the whole should make a much more favorable comparison since advancing prices will modify inventory write-downs as well as permit a wider profit margin.

ANNUAL REPORT of Humble Oil and Refining for 1932 revealed an exceptionally strong financial position with current assets of $55,657,652, including cash and demand loans of $19,785,276, as against current liabilities of only $10,534,061. Despite an increase of approximately $4,000,000 in charges for depreciation, net income for the year showed a sharp gain amounting to $14,896,613 as compared with $2,765,092 in the preceding year. Costs and expenses were reduced about $2,000,000 while taxes showed an increase of over $700,000. Profit and loss surplus at the end of 1932 equalled $117,589,683 as compared with $109,567,972 at the end of 1931.

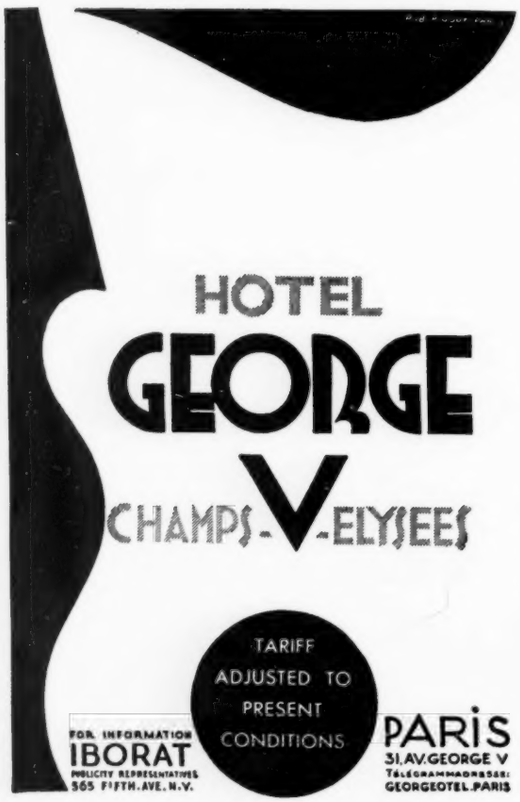
FOR THE YEAR ended December 31, 1932, Imperial Oil, Ltd. (controlled by Standard Oil Co. of New Jersey) reported net income of $14,713,237 after all charges, equivalent to 55 cents a share on 26,783,092 shares of no par value stock. This compared with net income of $18,226,894 or 68 cents a share in 1931. Company's report was certified by independent auditors.

THE UNFAVORABLE conditions prevailing in the oil industry in the first quarter were reflected in the report of Mid-Continent Petroleum Corporation which showed a net loss of $1,469,928 after all charges, compared with net loss of $1,035,738 in the first quarter of 1932.

SUN OIL COMPANY has declared two regular quarterly dividends of 25 cents on the common, payable September 15 and December 15, to stock of record August 25 and November 25, respectively. The company also declared two regular quarterly dividends of $1.50 each on the preferred stock, payable September 1 and December 1 to stock of record August 10 and November 10, respectively. Sun Shipbuilding and Dry Dock Company, a subsidiary of Sun Oil, intends to bid on some of the new government work provided for in the $238,000,000 allotted to the Navy Department to build up the U. S. Navy to treaty strength. Sun Shipbuilding has usually specialized in oil tankers, supplying not only Sun Oil but other oil companies. It has also built smaller passenger vessels.

C. C. BAILEY

New York Stock Prices

1933 High	1933 Low	Current Div. $ per Annum	Stock (Par Value $)	May 22—June 17 Sales (Shares)	First	High	Low	Last	Net Change[1]
39¾	18½	2.00	Amerada (No)	78,500	34¼	39¾	34	35¾	+ ½
28⅜	12⅜	1.00	Atlantic Refining (25)	380,700	21⅝	28⅜	21⅛	25¾	+ 4⅜
9⅜	3	....	Barnsdall (5)	422,600	6½	9⅜	6½	8¼	+ 1¾
2⅜	¼	....	Colon Oil (No)	50,400	⅞	2⅜	¾	1⅞	+ 1⅛
14½	5	....	Consol Oil (No)	1,109,800	9⅛	14½	9⅛	13¼	+ 4
15	4⅞	....	Continental Oil (5)	585,000	12⅞	15	12¼	13⅞	+ 1⅝
7½	2¼	....	Creole Petroleum (5)	132,500	5¼	7½	4¾	6½	+ 1¼
59	24	....	Gulf Oil Corp. (25)	95,600	44	59	42½	54	+10½
87	40	2.00	Humble Oil & Ref. (25)	39,500	60⅛	87	58½	77¾	+19¼
12	6½	0.50	Imperial Oil, Ltd. (No)	63,600	9¾	12	9¾	10¾	+ 1
16¼	8⅞	§0.28	International Petr. (No)	110,900	13⅛	16¼	12½	15	+ 2¼
12	3¾	....	Mid-Continent (No)	129,500	9¾	12	9½	10¾	+ 1½
15¼	4¾	....	Ohio Oil (No)	500,500	10⅝	15¼	10⅜	14	+ 3¼
15	4¾	....	Phillips Petr. (No)	422,600	12½	15	11⅜	13⅛	+ ⅝
8⅞	2½	....	Pure Oil (25)	253,600	7	8⅞	7	8	+ ⅛
28⅝	17⅝	†6%	Royal Dutch, N. Y. (13⅜)	24,200	24	28⅝	23⅝	25¾	+ 2¼
33½	15	‡0.60	Seaboard Oil (No)	145,100	30	33½	27⅝	28¼	− 1
8⅝	4	....	Shell Union (No)	317,400	7⅛	8⅝	6⅜	6⅞	− ⅛
12⅜	4⅞	0.25	Simms Petr. (10)	45,000	9¼	12⅜	9	10⅛	+ 1⅛
9⅞	3	....	Skelly Oil (25)	26,100	6⅛	9⅞	6⅛	7⅞	+ 1¾
12¼	6	....	Socony-Vacuum (25)	820,000	10	12¼	9¾	10¾	+ ¾
35	19½	1.00	Standard Oil of Calif. (No)	284,700	31⅛	35	30¼	33	+ 2¼
30½	17	1.00	Standard Oil, Ind. (25)	253,500	25⅛	30½	25⅛	29½	+ 4⅜
26¼	12¾	....	Standard Oil, Kansas (25)	24,200	17½	26¼	16	22	+ 4¼
17¾	8⅜	1.00	Standard Oil, Ky. (10)	47,600	14⅛	17¾	13⅝	15⅝	+ 2⅛
38⅜	22¾	1.00	Standard Oil, N. J. (25)	589,100	34	38⅜	33½	35⅝	+ 1⅝
44½	35	*1.00	Sun Oil (No)	7,800	40½	44½	40⅛	42	+ 1¾
23½	10¾	1.00	Texas Corp. (25)	417,900	18¼	23½	17⅞	21⅜	+ 3¼
8⅝	3⅛	....	Tide Water Assoc. (No)	429,000	5½	8⅝	5½	7⅞	+ 2½
19	8½	1.00	Union Oil of Calif. (25)	184,900	13½	19	13½	17	+ 3½
1½	⅛	....	Venezuelan Petr. (5)	27,700	1 1/16	1½	½	⅞	+ ⅛

[1] Since close of last month's table. † Paid for 1932—no regular rate.
‡ Also 10c extra this year.
* Also paid 2% in stock for 1932.
§ Latest dividend—in Canadian Funds.